PROJECT TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

01000 GENERAL CONTRACT REQUIREMENTS
01025 MEASUREMENT AND PAYMENT
01090 SOURCES FOR REFERENCE PUBLICATIONS
01330 SUBMITTAL PROCEDURES
01354 ENVIRONMENTAL PROTECTION
01356 STORM WATER POLLUTION PREVENTION PLAN
01451 CONTRACTOR QUALITY CONTROL

DIVISION 02 - SITE WORK

02111 CLEARING AND GRUBBING
02213 ENGINEERING FABRIC
02222 EXCAVATION FOR LEVEES
02226 EXCAVATION, FILL, AND BACKFILL FOR STRUCTURES
02230 EMBANKMENT
02301 LEVEE SURFACING
02380 STONE PROTECTION
02610 CORRUGATED STEEL SHEETING AND WALKWAY BRIDGE
02707 LINED AND EMBEDDED CYLINDER CONCRETE PRESSURE PIPE
02714 DEWATERING
02719 CORRUGATED METAL PIPE
02821 SECURITY FENCE
02933 NEW TURF ESTABLISHMENT
02960 EROSION CONTROL
02961 LIME TREATMENT OF STRUCTURE EMBANKMENT

DIVISION 03 - CONCRETE

03101 FORMWORK FOR CONCRETE
03307 CONCRETE

DIVISION 05 - METALS

05500 MISCELLANEOUS METAL

DIVISION 15 - MECHANICAL

15151 SLUICE GATE AND MANUALLY OPERATED GATE HOIST

-- End of Project Table of Contents --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01000

GENERAL CONTRACT REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES
1.2 PARTNERING
1.3 RIGHTS-OF-WAY
1.4 PRECONSTRUCTION CONFERENCE
1.5 SUBMITTAL OF SUBCONTRACTING PLAN
1.6 NOTIFICATION OF AREA ENGINEER BEFORE BEGINNING WORK
1.7 ORDER OF WORK
1.8 PROGRESS CHART
1.9 DESIGNATED BILLING OFFICE
1.10 PAYMENT INVOICES
1.11 TEMPORARY PROJECT FENCING
1.12 AS-BUILT DRAWINGS
1.13 PROJECT SIGN (APR 1991)
1.14 MINIMUM REQUIRED INSURANCE
1.15 WORK IN QUARANTINED AREA
1.16 CERTIFICATES OF COMPLIANCE
1.17 SAFETY
1.18 SAFETY SIGN
1.19 ACCIDENT PREVENTION PLAN
1.20 DAILY INSPECTIONS
1.21 ACCIDENT INVESTIGATIONS AND REPORTING
1.22 ACCOMMODATIONS FOR GOVERNMENT REPRESENTATIVES
1.23 MACHINERY AND MECHANIZED EQUIPMENT
1.24 VEHICLE WEIGHT LIMITATIONS
1.25 PUBLIC AND PRIVATE UTILITIES
1.26 DAMAGE TO WORK
1.27 ENERGY CONSERVATION
1.28 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER
1.29 CONTROL OF ACCESS TO CONSTRUCTION AREAS
1.30 MAINTENANCE OF TRAFFIC
1.31 HARBOR MAINTENANCE FEE

PART 2 PRODUCTS

PART 3 EXECUTION

-- End of Section Table of Contents --

SECTION 01000

GENERAL CONTRACT REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

CODE OF FEDERAL REGULATIONS (CFR)

19 CFR 24.24	Harbor Maintenance Fee
33 CFR 156	Oil and Hazardous Material Transfer Operations

ENGINEERING MANUALS (EM)

EM 385-1-1	(1996) U.S. Army Corps of Engineers Safety and Health Requirements Manual

1.2 PARTNERING

To enhance the potential for success on this contract, the Government encourages formation of a project partnership among all stakeholders (Government, Contractor, Subcontractors, Suppliers and Customer as appropriate). Project partnering provides a structured management approach to facilitate teamwork across contractual boundaries. This proposed partnership would strive to develop a cooperative working relationship to jointly establish and effectively reach mutual project execution goals. Participation in such a partnership will be totally voluntary. The partnering process would normally include an initial offsite kickoff meeting and follow-on maintenance meetings as agreed by the partnership. Costs of such meetings would be shared between the Government and the Contractor, based on a mutual agreement, without change to the contract price. The partnering process will in no way relax nor stiffen the requirements of the contract, but enhance the likelihood of success through improved working relationships.

1.3 RIGHTS-OF-WAY

a. The rights-of-way for the work to be constructed under this contract, within the limits indicated on the drawings, will be provided by the Government without cost to the Contractor. If these rights-of-way are used by the Contractor, he shall, at his own expense, do all work necessary to make such rights-of-way suitable for traveling to and from the worksite. Upon completion of the Contractor's work, any such rights-of-way furnished by the Government shall be left in a condition satisfactory to the Contracting Officer.

b. When so directed by the Contracting Officer, the Contractor shall, without expense to the Government and at any time during the progress of the work when it is not being actively used for contract operations,

promptly vacate and clean up any part of the Government grounds or rights-of-way that have been allotted to or have been in use by the Contractor.

c. The Contractor shall not obstruct any existing roads on lands controlled by the United States except with written permission of the Contracting Officer and shall maintain such roads in as good condition as exists at the time of commencement of work under this contract.

d. The Contractor shall procure, without expense to the Government, all additional lands, access roads, or rights-of-way necessary for his use in the performance of the work or as required by his method of operation. The Contractor shall submit written evidence to the Contracting Officer that he has obtained the rights-of-way from the property owners. The written evidence shall consist of an authenticated copy of the conveyance under which the Contractor acquired such rights-of-way, prepared and executed in accordance with the laws of the State in which the land is located. The Contractor shall also obtain from the owners a release for the Government for any damages which may result from his use of such rights-of-way. The written conveyance and release shall be provided to the Government prior to use of Contractor obtained additional lands, access roads, or rights-of-way. If temporary rights-of-way are obtained by the Contractor the period of time for those rights shall coincide with Section 00800 SPECIAL CONTRACT REQUIREMENTS, paragraph COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK, plus a reasonable time for any extension granted for the completion of the work. Any agreements or permits with levee boards, counties, parishes, municipalities, or other political subdivisions for moving material and equipment will be the responsibility of the Contractor and will be obtained at no expense to the Government. Any delays to the Contractor resulting from delays in procuring such additional lands, access roads, rights-of-way, or permits for moving material and equipment for his work under this contract will not be a basis for any claim for increase in the cost of this contract. The Contractor shall make his own investigations to determine the conditions, restrictions and difficulties which may be encountered in acquiring such rights-of-way and in the transportation of material and equipment. In addition, the Contractor shall be solely liable for any and all damages and claims of any nature whatsoever arising from or growing out of the acquisition and use of rights-of-way, etc. other than those furnished by the Government.

e. Notwithstanding any language or drawings to the contrary in this contract, the United States will not provide access or rights-of-way over any public lands and will not be responsible for acquiring such.

f. The Contractor shall repair at no expense to the Government, any and all damage to any existing roads when such damage is a result of his operations under this contract. (CEMVK-OC, 1989)

1.4 PRECONSTRUCTION CONFERENCE

a. A preconstruction conference will be arranged by the Area Engineer as soon after contract award as possible, and the conference will be conducted before work is allowed to commence. The Area Engineer will notify the Contractor of the time, date, and location for the meeting. At this conference, the Contractor will be oriented with respect to contract administration procedures, lines of authority, and construction matters. All known subcontractors performing at least 20

percent of the contract are required to attend this conference. Additional conferences may be established by the Area Engineer for any major subcontractors unknown at the time of the initial conference.

b. Submission by the Contractor of the items listed below will determine the date of the conference. The following items shall be submitted to the Area Engineer for review at least seven (7) calendar days prior to the preconstruction conference:

(1) Accident Prevention Plan

(2) Environmental Protection Plan

(3) Quality Control Plan

c. The Contractor shall bring to this conference, in completed form the following:

(1) Letter of superintendent appointment and authority

(2) List of subcontractors

d. The Contractor should bring to this conference, or at least be prepared to discuss, the following:

(1) Submittal register

(2) Progress chart

e. Minutes of this conference will be taken and prepared by the Area Engineer and sent to the Contractor for his concurrence and signature.

1.5 SUBMITTAL OF SUBCONTRACTING PLAN

a. This paragraph does not apply to small business concerns.

b. After bid opening, and within 7 days, the apparent low bidder, upon telephone notification by the Small and Disadvantaged Business Utilization Specialist, shall submit a Small and Disadvantaged Business Subcontracting Plan. The plan shall be submitted in accordance with Contract Clauses UTILIZATION OF SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS CONCERNS and SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING PLAN - ALTERNATE 1, and the person responsible for administering the plan shall be named in paragraph AGENT FOR SUBMITTING SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING PLAN of the Representations and Certifications.

1.6 NOTIFICATION OF AREA ENGINEER BEFORE BEGINNING WORK

At least 7 days before beginning work and at least one day before resuming work after a period of 7 days or more when no work has been performed, the Contractor shall notify Mr. Gerald R. McDonald, Area Engineer, Vidalia Area Office, P.O. Box 910, Vidalia, Louisiana 71373-0910, Telephone (318) 336-5226.

1.7 ORDER OF WORK

The work shall be carried on in accordance with the Progress Chart

(schedule) required by paragraph (a) of the Contract Clause SCHEDULES FOR CONSTRUCTION CONTRACTS. In preparing the Progress Chart (schedule), the Contractor shall give the following priority to the work:

The Item 1C levee shall be constructed up to levee grade 18.0 meters, NGVD, before initiation of the Item 1D levee embankment. Clearing and grubbing and construction of the drainage structures within Item 1D as well as other work associated with Item 1C may begin at anytime once notice to proceed is recieved.

1.8 PROGRESS CHART

The progress chart required by provisions of paragraph (a) of the Contract Clause SCHEDULES FOR CONSTRUCTION CONTRACTS shall be prepared on ENG FORM 2454, copies of which will be furnished to the Contractor by the Government. SIX (6) COPIES OF THE SCHEDULE WILL BE REQUIRED.

1.9 DESIGNATED BILLING OFFICE

The designated billing office for this contract shall be U.S. Army Corps of Engineers, Vidalia Area Office, P.O. Box 910, Vidalia, Louisiana 71373-0910.

1.10 PAYMENT INVOICES

a. The Federal Acquisition Regulation requires that the "REMIT TO" address on the invoice match the "REMIT TO" address on the contract or a proper notice of assignment. The Payment Office will verify a match of the "REMIT TO" address in the contract and Contractor’s invoice prior to payment. If the addresses do not match, the invoice will be determined improper and returned to the Contractor for correction and resubmission. If an invoice is improperly returned, the original invoice receipt date shall be used as the basis for determining interest to be paid in accordance with the PROMPT PAYMENT ACT.

b. Among other things, the Contract Clause PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS requires that a proper invoice for payment include substantiation of the amounts requested. As required in Office of Management and Budget, Circular A-125 (Rev.), PROMPT PAYMENT, dated December 12, 1989, substantiation of the amount requested for progress payments under construction contracts includes the following:

(1) An itemization of the amounts requested related to the various elements of work required by the contract covered by the payment request;

(2) A listing of the amount included for work performed by each subcontractor under the contract;

(3) A listing of the total amount of each subcontract under the contract;

(4) A listing of the amounts previously paid to each such subcontractor under the contract; and,

(5) Additional supporting data in a form and detail required by the contracting officer.

c. Failure to include the above information in a Contractor’s invoice will result in the invoice being considered defective under the

provisions of the PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS clause of the contract, and it will be returned to the Contractor for correction and resubmission. (CEMVK-OC, 1997)

1.11 TEMPORARY PROJECT FENCING

Temporary project fencing as required by Section 4, "Temporary Facilities", paragraph 04.A.04 of EM 385-1-1, U.S. Army Corps of Engineers Safety and Health Requirements Manual, dated 3 September 1996, is not required on this project.

1.12 AS-BUILT DRAWINGS

This paragraph supplements the Contract Clause SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION.

a. As-Built Contract Drawings. The Contractor shall maintain two (2) full-size sets of blue-line prints of the contract drawings depicting in red a record of as-built conditions. The Contractor shall also maintain a set of electronic CADD format design files. The original CADD format design files will be provided to the Contractor. The exact CADD file format shall be discussed with the Contracting Officer before work commences. These drawings, both electronic and blueline, shall be maintained in current condition at all times during the entire contract period. The drawings shall be updated daily by the Contractor showing all changes from the contract plans which are made in the work, additional information which might be uncovered in the course of construction, and information for future construction reference (such as debris disposed by burying). This information shall be recorded on the blueline prints accurately and neatly by means of details and notes. The electronic files shall be edited to reflect as-built conditions in accordance with the CADD standards. Each month, prior to submitting a request for progress payment, the Contractor shall review the as-built drawings with the Contracting Officer, and the Contractor shall certify that the as-built drawings are accurate and up-to-date before progress payment is made. The Contractor shall deliver to the Contracting Officer two (2) complete sets of the as-built marked prints at the time of the final inspection of the project. The as-built drawings shall be identified by entering the words "AS-BUILT DRAWINGS" in letters at least 5 mm high, placed below each title block.

b. As-Built Shop Drawings. Upon completion of individual features of work, the Contractor shall revise and resubmit any shop drawings for the feature as necessary to show as-built conditions. The notation "Revised to show as-built conditions" shall be placed in red in the lower right corner of each drawing, along with the initials of a responsible company representative. Each revised as-built shop drawing or catalog cut shall be resubmitted using ENG FORM 4025, enclosed at the end of Section 01330 SUBMITTAL PROCEDURES.

c. Electronic drawings and plates shall be prepared as required to present project details. All drawings shall be furnished in a Microstation design file compatible format and provided on ISO 9660 (International Standard Organization) format CD-ROM. All media shall be labeled with the following pertinent information: (1) the save set name if applicable, (2) the DOS or Windows NT version if applicable, (3) the date of creation, (4) a short description of the contents. A transmittal sheet containing the above information and the file names on each disk shall accompany the media set. Deliverables shall include

all design files, cell libraries, matrix menus, database files, font libraries, ASCII xyz files or any other files used in the creation of the project. Two sets of electronic drawings on CD-ROM and one paper set of the electronic drawings shall be plotted and provided with all electronic format CADD files showing as-built conditions shall be delivered to the Contracting Officer no later than 60 days after project transfer. All files and backups shall be of current version in operation by the Vicksburg District at time of contract award. The external design file specification, level assignments, line styles, and line weights shall be in accordance with the Tri-Service A/E/C CADD Standards Version 1.7 or latest version. These standards are a product of the Tri-Service CADD/GIS Technology Center at Waterways Experiment Station, Vicksburg, Mississippi. Information on obtaining copies of these standards may be accessed on the Internet World Wide Web at http://tsc.wes.army.mil.

d. No separate measurement or payment will be made for providing as-built drawings, as-built shop drawings, electronic drawings and plates, or for any of the work required by this clause, and all costs therefor shall be included in the applicable contract prices contained in the Bidding Schedule.

1.13 PROJECT SIGN (APR 1991)

The Contractor shall fabricate, erect and maintain one sign for project identification. The sign shall be displayed and positioned for reading by passing viewers. The exact location is subject to Contracting Officer's approval. Information for the right side of the project sign shall be as follows:

Title:	SICILY ISLAND AREA LEVEE PROJECT ITEM IC AND ID
Project:	FLOOD CONTROL, MISSISSIPPI RIVER AND TRIBUTARIES TENSAS BASIN-RED RIVER BACKWATER AREA CATAHOULA PARISH, LOUISIANA
Contract No:	DACW38-00-C-0XXX
Contractor:	(Contractor's name and city)

The project identification sign shall meet the requirements specified in the U.S. Army Corps of Engineers Sign (USACES) Standards Manual, EP 310-1-6a and EP 310-1-6b. A copy of the sign standards manual is available for review at the office of the Vicksburg District Sign Program Manager and questions concerning manufacture and installation of the project identification sign may be addressed to:

Vicksburg District Sign Program Manager (Lawran Richter)
ATTN: CEMVK-OD-MN
4155 Clay Street
Vicksburg, MS 39183-3435
Telephone: (601) 631-5287

1.14 MINIMUM REQUIRED INSURANCE

The following paragraph is applicable if the services involved are performed on a Government Installation. Government Installation is defined

as property where the Government holds by fee simple title, by construction rights-of-way, or perpetual easement, etc., an interest in real property. See Contract Clause INSURANCE-WORK ON A GOVERNMENT INSTALLATION.

a. Workmen's Compensation and Employer's Liability Insurance. The Contractor shall comply with all applicable workmen's compensation Statutes of the State of Louisiana and shall furnish evidence of Employer's Liability Insurance in an amount of not less than $100,000.

b. General Liability Insurance. Bodily injury liability insurance in the minimum limits of $500,000 per occurrence on the comprehensive form of policy.

c. Automobile Liability Insurance. Minimum limits of $200,000 per person and $500,000 per occurrence for bodily injury and $20,000 per occurrence for property damage. This insurance shall be on the comprehensive form of policy and shall cover the operation of all automobiles used in performance of the contract.

1.15 WORK IN QUARANTINED AREA

The work called for by this contract involves activities in parishes quarantined by the Department of Agriculture to prevent the spread of certain plant pests which may be present in the soil. The Contractor agrees that all construction equipment and tools to be moved from such parishes shall be thoroughly cleaned of all soil residues at the construction site with water under pressure and that hand tools shall be thoroughly cleaned by brushing or other means to remove all soil. In addition, if this contract involves the identification, shipping, storage, testing, or disposal of soils from such quarantined area, the Contractor agrees to comply with the provisions of ER 1110-1-5, "Plant Pest Quarantined Areas and Foreign Soil Samples" attachments, a copy of which will be made available by the Contracting Officer upon request. The Contractor agrees to assure compliance with this obligation by all subcontractors.

1.16 CERTIFICATES OF COMPLIANCE

Any certificates required for demonstrating proof of compliance of material with specification requirements shall be executed in accordance with Section 01330 SUBMITTAL PROCEDURES. Each certificate shall be signed by an official authorized to certify on behalf of the manufacturing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specific requirements.

1.17 SAFETY

This contract is subject to the requirements of EM 385-1-1, U.S. Army Corps of Engineers Safety and Health Requirements Manual, dated 3 September 1996. No separate payment will be made for compliance with the requirements thereof.

1.18 SAFETY SIGN

The Contractor shall fabricate, erect and maintain a safety sign at the site, as located by the Contracting Officer. The sign shall be erected as soon as practicable, but not later than 15 calendar days after the date established for commencement of work. The data required shall be current. The safety sign shall meet the requirements specified in the U.S. Army Corps of Engineers Sign (USACES) Standards Manual, EP 310-1-6a and EP 310-1-6b. A copy of the sign standards manual is available for review at the office of the Vicksburg District Sign Program Manager and questions concerning manufacture and installation of the safety sign may be addressed to:

Vicksburg District Sign Program Manager (Lawran Richter)
ATTN: CEMVK-OD-MN
4155 Clay Street
Vicksburg, MS 39183-3435
Telephone: (601) 631-5287

1.19 ACCIDENT PREVENTION PLAN

Refer to Contract Clause ACCIDENT PREVENTION (Alternate I). Within 15 days after receipt of award of the contract, an Accident Prevention Plan shall be submitted to the Contracting Officer for review and acceptance. The plan shall be prepared in the following format:

a. An executed LMV FORM 358-R, "Administrative Plan" (available upon request), see Appendix A, "Minimum Basic Outline for Accident Prevention Plan" of EM 385-1-1.

b. An executed LMV FORM 359-R, "Activity Hazard Analysis" (available upon request), see paragraph 01.A.09 and figure 1-1 of EM 385-1-1.

c. A copy of company policy statement regarding accident prevention.

d. When marine plant and equipment are in use under a contract, the method of fuel oil transfer shall be submitted on LMV Form 414R Fuel Oil Transfer, (available upon request). (Refer to 33 CFR 156.)

e. The Contractor shall not commence physical work at the site until the plan has been accepted by the Contracting Officer, or his authorized representative. At the Contracting Officer's discretion, the Contractor may submit his Activity Hazard Analysis only for the first phase of construction provided that it is accompanied by an outline of the remaining phases of construction. All remaining phases shall be submitted and accepted prior to the beginning of work in each phase. Also, refer to Section 1, "Program Management", paragraph 01.B, "Indoctrination and Training" of EM 385-1-1.

1.20 DAILY INSPECTIONS

Refer to Contract Clause INSPECTION OF CONSTRUCTION. The Contractor shall perform daily safety inspections and record them on the forms approved by the Contracting Officer. Reports of daily inspections shall be maintained at the job site. The reports shall be records of the daily inspections and resulting actions. As a minimum each report shall include the following:

a. Phase(s) of construction underway during the inspection

b. Locations or areas inspections were made.

c. Results of inspection, including nature of deficiencies observed and corrective actions taken, or to be taken, date, and signature of the person responsible for its contents.

1.21 ACCIDENT INVESTIGATIONS AND REPORTING

Refer to EM 385-1-1, Section 1, "Program Management", paragraph 01.D, "Accident Reporting and Recordkeeping". Accidents shall be investigated and reports completed by the immediate supervisor of the employee(s) involved and reported in writing to the Contracting Officer or his representative within one working day after the accident occurs.

1.22 ACCOMMODATIONS FOR GOVERNMENT REPRESENTATIVES

a. Accommodations. The Contractor shall furnish and maintain a temporary building for the exclusive use of the Government Representatives. The building shall be of light, but weatherproof construction, approximately 11.1 square meters in size with not less than 2.1 meters of headroom. It shall have a substantial workbench along one side and sufficient number of windows to admit ample working light. Windows shall be arranged to open and to be securely fastened from the inside. The door shall be of wood panel or solid core construction and be equipped with a padlock and heavy duty hasp bolted to the door. Insect screens shall be provided for windows. Glass panels in windows shall be equipped with bars or heavy mesh screens which will prevent easy access to the building through these panels. The Contractor shall heat the building by means of heaters and shall cool the building by means of an air conditioning unit. Electric current shall also be provided for operation of lights, appliances, and electric calculators at 115 volts AC. Electric current may be provided by use of a portable generator. A minimum of two wall outlets and two ceiling drops shall be provided in the building. One office desk and a minimum of two chairs shall be provided in the building. Telephone service with an exclusive line solely for Government use shall be furnished to the Government Representative building. Toilet facilities shall be provided in the building or adjacent thereto. The building shall remain the property of the Contractor and upon completion of all work under the contract shall be removed as provided in the Contract Clause OPERATIONS AND STORAGE AREAS. An office trailer meeting the above requirements will be acceptable.

b. Janitor Services. The Contractor shall furnish daily janitorial services for the above offices and perform any required maintenance of subject facility and adjacent grounds during the entire life of the contract. Toilet facilities shall be clean and sanitary at all times. Services shall be performed at such a time and in such a manner to least interfere with the operations but will be accomplished only when the facility is in daily use. The Contractor shall also provide daily trash collection and cleanup of the building and adjacent outside areas, and shall dispose of all discarded debris in a manner approved.

c. Should the Contractor refuse, neglect, or delay compliance with the above requirements, the specific facilities may be furnished and maintained by the Contracting Officer, and the cost thereof will be deducted from any amount due or to become due the Contractor.

1.23 MACHINERY AND MECHANIZED EQUIPMENT

Machinery and mechanized equipment used under this contract shall comply with the following:

a. When mechanized equipment is operated on floating plant, the Contractor shall provide positive and acceptable means of preventing this equipment from moving or falling into the water. The type of equipment addressed by this clause includes front-end loaders, bulldozers, trucks (both on- and off-road), backhoes, hydraulic excavators (track hoes), and similar equipment. If the Contractor plans to use such equipment on floating plant, an activity hazard analysis must be developed for this feature of work. The plan must include a detailed explanation of the type or types of physical barriers, curbs, structures, etc., which will be incorporated to protect the operator and prevent the equipment from entering the water. Nonstructural warning devices may be considered for situations where the use of structural barriers is determined to be impracticable. The activity hazard analysis must thoroughly address the procedure and be submitted to the Corps for review and acceptance prior to start of this feature of work.

b. The stability of crawler, truck, and wheel-mounted cranes shall be assured.

(1) The manufacturer's load-rating chart may be used to determine the maximum allowable working load for each particular crane's boom angle provided a test load, with a boom angle of 0.35 rads, confirms the manufacturer's load-rating table.

(2) Stability tests are required if:

(i) there is no manufacturer's load-rating chart securely fixed to the operator's cab;

(ii) there has been a change in boom or other structural member or,

(iii) there has been a change in the counterweight.

The test shall consist of lifting a load with the boom in the least stable undercarriage position and at an angle of 0.35 rads 20 degrees above the horizontal. The test shall be conducted under close supervision on a firm, level surface. The load that tilts the machine shall be identified as the test load. The test load moment (N-m)(in ft-lbs) shall then be calculated by multiplying the horizontal distance (in meters) (in ft) from the center of rotation of the machine to the test load, times the test load (in N). (in lbs). Three-fourths of this test-load moment shall then be used to compute the maximum allowable operating loads for the boom at 0.35, 0.70, 1.05 and 1.40 rads 20, 40 ,60, and 80 degrees above horizontal. From these maximum allowable operating loads, curve shall be plotted and posted in the cab of the machine in sight of the operator. These values shall not be exceeded except in the performance test described below. The test load shall never exceed 100 percent of the manufacturer's maximum rated capacity.

(3) In lieu of the test and computations above, the crane may be load tested for stability at each of the four boom positions listed above.

c. Performance tests shall be performed in accordance with Section 16, "Machinery and Mechanized Equipment" of EM 385-1-1, U.S. Army Corps of Engineers Safety and Health Requirements Manual, except as specified below. Performance tests shall be conducted after each stability test, when the crane is placed in service on a project, and at least every 12 months.

(1) When conducting a performance load test which is required of a new crane or a crane in which load sustaining parts have been altered, replaced, or repaired (excluding replacement of the rope), the test load shall be as specified in ASME/ANSI B30 Series. That is, for overhead, gantry, portal, pillar, tower, monorail, and underhung cranes, the test load shall not exceed 125 percent of the manufacturer's load rating capacity chart at the configuration of the test; and for hammerhead tower, mobile, and floating cranes and boom trucks, the test load shall not exceed 110 percent of the manufacturer's load rating capacity chart at the configuration of the test.

(2) When conducting a performance load test which is required because a crane is reconfigured, or reassembled after disassembly, or because the crane requires an annual load test, the test loads shall not exceed 100 percent of the manufacturer's load rating capacity chart at the configuration of the test.

(3) All load tests are required to be conducted in accordance with the manufacturer's recommendations.

d. Inspections shall be made which will ensure a safe and economical operation of both cranes and draglines with inspection documented. Copies of the inspections and tests shall be available at the job site for review. All stability and performance tests on cranes and all complete dragline inspections shall be witnessed by the Contracting Officer or his authorized representative.

e. A complete dragline inspection shall be made:

(1) at least annually;

(2) prior to the dragline being placed in operation; and

(3) after the dragline has been out of service for more than 6 months.

f. All heavy equipment moved onto the worksite shall be inspected for compliance with this contract. Some MVD Inspection forms are attached at the end of this section. All completed forms, including abatement schedule of any violations, shall be maintained at the job site for continued review and update as needed.

1.24 VEHICLE WEIGHT LIMITATIONS

Vehicle weight limitations for operation on rural roads and bridges may affect the prosecution of work in this contract. The Contractor will be responsible for obtaining all necessary licenses and permits in accordance with the Contract Clause PERMITS AND RESPONSIBILITIES. Current information regarding road and bridge weight limits may be obtained by contacting the Louisiana Department of Transportation and Development and the police jury

for the parishes through which equipment and materials will be transported as a result of this contract.

1.25 PUBLIC AND PRIVATE UTILITIES

a. Unless otherwise specified, shown on the drawings, or stated in writing by the Contracting Officer, the Contractor shall not remove or disturb any public or private utilities. Such removals, alterations, and relocations, where necessary, will be made by others. The locations, if any, shown on the drawings for underground utilities are approximate only. The exact locations of such utilities shall be determined by the Contractor in the field prior to commencing construction operations in their vicinity.

b. The attention of the Contractor is directed to the possibility that he may encounter, within the right-of-way limits, utilities, some of which may be buried, and the existence of which is presently not known. Should any such utilities be encountered, the Contractor shall immediately notify the Contracting Officer so that he may determine whether they shall be removed, relocated, or altered. After such determination is made, the Contractor shall, if so directed by the Contracting Officer, remove, relocate, or alter them as required, and an equitable adjustment will be made in accordance with the Contract Clause CHANGES. In event the Contracting Officer arranges for such removals, alterations, or relocations to be performed by others, the Contractor shall cooperate with such others during the latter's removal, alteration, or relocation operations in accordance with the Contract Clause OTHER CONTRACTS.

1.26 DAMAGE TO WORK

a. The responsibility for damage to any part of the permanent work shall be as set forth in the Contract Clause PERMITS AND RESPONSIBILITIES. However, if, in the judgement of the Contracting Officer, any part of the permanent work performed by the Contractor is damaged by flood (see Section 00800 SPECIAL CONTRACT REQUIREMENTS, paragraph PHYSICAL DATA, subparagraph FLOODS) or earthquake, which damage is not due to the failure of the Contractor to take reasonable precautions or to exercise sound engineering and construction practices in the conduct of the work, the Contractor shall make repairs as ordered by the Contracting Officer and full compensation for such repairs to permanent work will be made at the applicable contract unit or lump sum prices as fixed and established in the contract. If, in the opinion of the Contracting Officer, for any part of such damaged permanent work, there is no applicable contract unit or lump sum price, then an equitable adjustment pursuant to the Contract Clause CHANGES will be made as full compensation for the repairs for that part of the permanent work for which there is no applicable contract unit or lump sum price.

b. Except as herein provided, damage to all work (including temporary construction), utilities, materials, equipment, and plant shall be repaired to the satisfaction of the Contracting Officer, at the Contractor's expense, regardless of the cause of such damage.

1.27 ENERGY CONSERVATION

The Contractor shall ensure that construction operations are conducted efficiently and with the minimum use of energy.

1.28 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

a. This provision specifies the procedure for determination of time extensions for unusually severe weather in accordance with Contract Clause DEFAULT (FIXED PRICE CONSTRUCTION). In order for the Contracting Officer to award a time extension under this paragraph, the following conditions must be satisfied:

(1) The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

(2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

b. The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY
WORK DAYS BASED ON FIVE (5) DAY WORK WEEK

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
(6)	(5)	(5)	(4)	(5)	(5)	(5)	(4)	(3)	(4)	(4)	(5)

c. Upon acknowledgement of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor shall record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day. The number of actual adverse weather days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph b, above, the contracting officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with Contract Clause DEFAULT (FIXED PRICE CONSTRUCTION).

1.29 CONTROL OF ACCESS TO CONSTRUCTION AREAS

a. This paragraph supplements the Contract Clauses PERMITS AND RESPONSIBILITIES and OPERATIONS AND STORAGE AREAS.

b. It shall be the responsibility of the Contractor to prevent possible injury to visitors to the project site. Only personnel engaged in contract work and others authorized by the Contracting Officer shall be permitted to enter into the construction areas. Suitable barriers, warning signs and directives shall be placed by the

Contractor to direct persons not engaged in the work away from the areas of danger. The Contractor shall be responsible for effective enforcement of this paragraph during the period of this contract.

1.30 MAINTENANCE OF TRAFFIC

a. The Contractor shall conduct his operations in such manner as to offer the least possible obstruction to the safe and satisfactory movement of traffic over the existing roads during the life of the contract.

b. The Contractor shall be responsible for providing, erecting, maintaining, and removal of all traffic signs, barricades, and other traffic control devices necessary for maintenance of traffic. See also paragraph entitled ACCIDENT PREVENTION PLAN and the Contract Clause entitled ACCIDENT PREVENTION.

c. All barricades, warning signs, lights, temporary signals, other devices, flagmen, and signaling devices shall meet or exceed the minimum requirements of Louisiana DOTD, Manual On Uniform Traffic Control Devices (See EM 385-1-1, U.S. Army Corps of Engineers Safety and Health Manual, 3 September 1996, Section 21, Paragraph 21.1.09.) The Contractor is responsible for the protection, maintenance, and replacement of all existing signs, route markers, traffic control signals, and other traffic control features during the life of this contract.

d. Prior to the commencement of construction operations the Contractor shall submit for the acceptance of the Contracting Officer, complete details of his proposed plans for the maintenance of traffic and access through the construction area.

e. The requirements of this paragraph shall be met by the Contractor at no additional expense to the Government.

1.31 HARBOR MAINTENANCE FEE

a. Offerors or bidders contemplating use of U.S. ports in the performance of contract are subject to paying a harbor maintenance fee on cargo. Federal law establishes an ad valorem port use fee on commercial cargo imported into or exported from various U.S. ports. The fee is 0.125 percent (0.00125). Cargo to be used in performing work under contracts with the U.S. Government is not exempt from the fee, although certain exemptions do exist. Offerors are responsible for ensuring that the applicable fee and associated costs are taken into consideration in the preparation of their offers. Failure to pay the harbor maintenance fee may result in assessment of penalties by the Customs Service.

b. The statute is at Title 26 U.S. Code section 4461 and 4462. Department of Treasury Customs Service regulations implementing the statute, including a list of ports subject to the fee, are found at 19 CFR 24.24, Harbor Maintenance Fee. Additional information may be obtained from local U.S. Customs Service Offices or by writing to the Director, Budget Division, Office of Finance, Room 6328, U.S. Customs Service, 1301 Constitution Avenue, N.W., Washington, D.C. 20229.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

SAFETY INSPECTION CHECK LIST FOR CONSTRUCTION EQUIPMENT U. S. Army Engineer Division, Mississippi Valley	Date of Inspection
Contractor or Unit	Contract No. or Activity
Inspected by (Signature)	Approved by (Signature)

Activity Inspected: NIGHT OPERATIONS **NOTE:** Corps of Engineers General Safety Requirements (EM 385-1-1) references are shown in parentheses.	Yes	No	Not App
1. General: a. On construction contracts, is there a designated Contractor's representative on duty during night operations?* b. Does the contractor have an approved Activity Hazard Analysis for night operations? (01.A.09) c. Has Activity Hazard Analysis been reviewed by all employees prior to start of operation and documented? (01.B.03) d. Is each new employee provided with initial safety orientation? (01.B.01) e. Are emergency phone numbers posted and at least 2 qualified first aid and CPR attendants on duty? (03.A.01, 03.A.02) f. Are weekly safety meetings being held for night shift employees, by field supervisors or foremen? g. Are regularly scheduled safety meetings being held, at least once a month, for night shift supervisors? (03.B.03) h. Are outlines of each safety meeting being maintained at project site? (01.B.03)			
2. Lighting: a. Is there adequate lighting in work areas? (07.A.01, Table 7-1, 16.A.11) b. Is there adequate lighting on decks, walkways and floating plant? (07.A.01, Table 7-1) c. Is there adequate lighting at crew boat loading dock and unloading areas? (07.A.01, Table 7-1) d. Are semi-portable equipment, floodlights, and work lights provided with protective grounding, if not exempted by NEC? (11.C.01)			
3. Transportation to and from floating plant: a. Is boat equipped with sufficient number of life preservers? (05.I.01) b. Is weather deck of boat coated with non-skid material? (19.B.01) c. Do guardrails meet requirements of EM 385-1-1? (19.B.01, 21.B.01, 21.B.07) d. If boat is more than 26 feet in length, does operator hold a current Coast Guard license? (19.A.02) e. If more than 6 passengers are carried, or boat length is greater than 26 feet in length, is vessel Coast Guard certified and operator licensed? (19.A.02) f. Does motor boats and skiffs meet minimum flotation requirements of Coast Guard? (19.C.02) g. Does boat have running lights as required by 33 CFR 81 APPA and 33 CFR 84 ANNEX 1 (regardless of length)? h. Is the capacity of boat and maximum no. of passengers posted in accordance with EM-385-1-1? (19.C.03) j. Is there safe, easy access from boat to landing? (19.B.01, 19.B.02))			
4. Miscellaneous: a. Are haul roads properly marked for night work? b. Are necessary access and haul roads provided to work area? (21.I.01) c. Are all employees dressed suitable for night operations? Minimum shall be short sleeve shirt, long trousers and leather or other protective work shoes. d. Are all vehicles and construction equipment properly lighted for night work? (18.A.04, 16.A.11) e. Does flag or signal person have reflectorized warning garments? (08.B.08) f. Are all spotters or signal personnel adequately trained for operation? (08.B.10)			
5. REMARKS: * (Ref. Contract General Provisions).			

SAFETY INSPECTION CHECK LIST FOR CONSTRUCTION EQUIPMENT U. S. Army Engineer Division, Mississippi Valley	Date of Inspection
Contractor or Unit	Contract Number - Job Description
Type of Equipment & Boom Length	Make, Model No., Identification
Inspected by (Signature)	Approved by (Signature)

CRANES AND DERRICKS **NOTE**: Corps of Engineers General Safety Requirements (EM 385-1-1) references are shown in parentheses.	Yes	No	Not App
1. Is a list of the required clearances from overhead power lines posted? If necessary to work near power lines, boom shall have insulating cage guard and load line shall have insulating link. (11.E.04, 11.E.07)			
2. Are load rating charts with the machine? (16.C.01, 16.C.13)			
3. Is a list of standard hand signals posted in cab? (16.C.10, 08.B.01, 08.B.02)			
4. Are shock absorbing boom stops installed on machine? (16.D.02)			
5. Has the manufacturer certified the boom stops? (16.D.02)			
6. Does the boom angle, levelness, and other indicators operate accurately? (16.D.01)			
7. Does the unit have a suitable fire extinguisher? (16.A.26)			
8. Are moving parts, gears, drums, shafts, belts adequately screened or guarded? (16.B.03)			
9. Is there adequate protection from hot pipes, etc? (16.B.03)			
10. Are steps, ladders, guard rails, provided for safe footing and access? (16.B.03, 21.A.01)			
11. Can lubrication and greasing be done safely? (16.B.13)			
12. Is the cab equipped with unbroken distortion free safety glass? (16.B.10)			
13. Is fuel tank located so that overflow and spills will not run into cab or come in contact with exhaust ? (16.B.04)			
14. Is the unit shut down for fueling, servicing, etc? (16.A.14)			
15. Are slings, fastenings, fittings inspected daily by a qualified person?* Is wire rope inspected by a competent person frequently? (Section 15)			
16. When wedge socket type fasteners are used, has the dead end been made secure against loosening? (15.B.04)			
17. Have the air tanks been tested and certified? (20.A.02)			
18. Are test and inspection records kept available as a part of the official project file? (16.A.01)			
19. Is there evidence of deformed, cracked, or corroded members in the crane structure or boom? * (ANSI)			
20. Do the drums have proper pawls or positive locking devices? (16.B.14)			
21. Is there sufficient cable available so as to allow three full wraps on the drum at all working positions? (16.C.09)			
22. Are daily inspections being made of all control mechanisms to assure that there is no maladjustment interfering with proper operation? *			
23. Are inspections being made, at least monthly, of control mechanisms for excessive wear of components, and contamination by lubricants, or other foreign matter? *			
24. Are frequent (daily to monthly) inspections being made of all safety devices? *			
25. Are daily inspections for deterioration, or leakage in air or hydraulic systems being made? *			
26. Are crane hook inspections being made frequently (daily to monthly) to assure that there are no cracks or that the normal hook throat opening has not increased more than 15% *			
27. Is there evidence of loose bolts or rivets? * (ANSI)			
28. Is there evidence of cracked or worn sheaves or drums? (15.F.04)			
29. Are parts such as pins, bearings, shafts, gears, rollers, and locking devices worn, cracked, or distorted?			

* (**Ref Contract Special Clauses**) (Continued on reverse)

CRANES AND DERRICKS	Yes	No	Not App
30. Is there evidence of excessive wear on brake and clutch system parts? *			
31. Is there evidence of excessively worn or damaged tires? *			
32. Is the power plant in good mechanical condition? *			
33. Are accessible areas within the swing radius of the rear barricaded? (16.C.08)			
34. Has a boom hoist disengaging device been installed on cranes with cable supported booms? (16.D.02)			
35. Is there a current set of operator's manuals available? (16.C.01)			
36. Are cranes and derricks operated by qualified operators? (16.C.04)			
37. Have lattice and Hydraulic cranes been equipped with a device to stop the load hoisting before the load block contacts the boom tip? (16.D.01)			

38. Crane Stability Test:

Amount of counterweight: _____ lb.

Boom Angle	Distance from Center Pin to Load Line R (ft)	Tipping Load I (lb)		Moment R x I		Maximum Allowable Load L=0.75 I	
		With Outriggers	Without Outriggers	With Outriggers	Without Outriggers	With Outriggers	Without Outriggers
20°	_____	_____	_____	_____	_____	_____	_____
40°	_____	_____	_____	_____	_____	_____	_____
60°	_____	_____	_____	_____	_____	_____	_____
80°	_____	_____	_____	_____	_____	_____	_____

39. Performance Test:

a. Complete items 1-32 on this form.

b. Determine performance test load (PTL) from the stability test above with the boom at the 80° position. PTL=(1.25)(L)

c. Position the boom in the 80° position and allow the crane to lift, lower, and hold the performance test load.

40. Remarks

SAFETY INSPECTION CHECK LIST FOR CONSTRUCTION EQUIPMENT U. S. Army Engineer Division, Mississippi Valley	Date of Inspection
Contractor or Unit	Contract Number - Job Description
Type of Equipment	Identification
Inspected by (Signature)	Approved by (Signature)

CRAWLER TRACTORS - DOZERS **NOTE:** Corps of Engineers General Safety Requirements (EM 385-1-1) references are shown in parentheses.	Yes	No	Not App
1. Is protection, (grills, canopies, screens) provided to shield operator from falling or flying objects? (16.B.10, 16.B.11)			
2. Is adequate roll over protection provided? (16.B.12)			
3. Are seat belts provided? (16.B.08, 16.b.12)			
4. Is the operator physically qualified? (01.C.01)			
5. Does the unit have a suitable fire extinguisher? (16.A.26)			
6. Is there an effective, working reverse alarm? (16.B.01)			
7. Are moving parts, shafts, sprockets, belts, etc. guarded? (16.B.03, 16.B.07)			
8. Is protection against contact with hot surfaces, exhaust, etc. provided? (16.B.03)			
9. Are all screens, guards, shields in place and effective? (16.B.03)			
10. Is the unit shut down for fueling, servicing, etc? (16.A.14)			
11. Is the dozer blade lowered when not in use? (16.A.09)			
12. Are sufficient lights provided for night operations? (16.A.11)			
13. Are there initial inspections and scheduled inspections of the equipment at regular intervals? (16.A.01, 16.A.02)			
14. Are fuel tanks located in a manner to prevent spills or overflows from running onto engine, exhaust, or electrical equipment? (16.B.04)			
15. Are exhaust discharges from equipment so directed that they do not endanger persons or obstruct the view of the operator? (16.B.05)			
16. Are inspection records kept available as a part of the official project file? (16.A.01)			
28. REMARKS:			

SAFETY INSPECTION CHECK LIST FOR CONSTRUCTION EQUIPMENT U. S. Army Engineer Division, Mississippi Valley	Date of Inspection
Contractor or Unit	Contract Number - Job Description
Type of Equipment & Boom Length	Make, Model No., Identification
Inspected by (Signature)	Approved by (Signature)

Equipment Inspected: DRAGLINES **NOTE:** Corps of Engineers General Safety Requirements (EM 385-1-1) references are shown in parentheses.	Yes	No	Not App
1. Is a list of the required clearances from overhead power lines posted? If necessary to work near power lines, boom shall have insulating cage guard and load line shall have insulating link. (11.E.04, 11.E.07)			
2. Does the unit have a suitable fire extinguisher? (16.A.26)			
3. Are moving parts, gears, drums, shafts, belts adequately screened or guarded? (16.B.03)			
4. Is there adequate protection from hot pipes, etc? (16.B.03)			
5. Are steps, ladders, guardrails, provided for safe footing and access? (16.B.03)			
6. Can lubrication and greasing be done safely? (16.A.08, 16.B.13)			
7. Is the cab equipped with unbroken safety glass? (16.B.10)(18.A.07)			
8. Is the fuel tank located so that overflow and spills will not run into cab or come in contact with exhaust? (16.B.04)			
9. Is the unit shut down for fueling, servicing, etc? (16.A.14)			
10. Is wire rope being inspected by a competent person frequently? (Daily to Monthly) (15.A.02)			
11. When wedge socket type fasteners are used, has the dead end been made secure against loosening? (15.B.04)			
12. Have the air tanks been tested and certified? (20.A.02,20.A.03)			
13. Are test records kept available as part of the official project file? (16.A.01)			
14. Is there evidence of deformed, cracked, or corroded members in the crane structure or boom?			
15. Do the drums have proper pawls or positive locking devices? (16.B.14)			
16. Is there sufficient cable available so as to allow three full wraps on the drum at all working positions? (16.C.09)			
17. Are daily inspections being made of all control mechanisms to assure that there is no maladjustment interfering with proper operation? (16.A.01,.02,.05)			
18. Are inspections being made, at least monthly, of control mechanisms for excessive wear of components, and contamination by lubricants, or other foreign matter? (16.A.01,.02,.05)			
19. Are frequent (daily to monthly) inspections being made of all safety devices? (16.A.01,.02,.05)			
20. Are daily inspections for deterioration, or leakage in air or hydraulic systems being made? (16.A.01,.02,.05)			
21. Is there evidence of loose bolts or rivets?			
22. Is there evidence of cracked or worn sheaves or drums?			
23. Are parts such as pins, bearings, shafts, gears, rollers, and locking devices worn, cracked, or distorted?			
24. Is there evidence of excessive wear on brake and clutch system parts?			
25. Is there evidence of excessively worn or damaged tires?			
26. Is the power plant in good mechanical condition?			
27. Is there evidence that the operator(s) are physically and emotionally qualified? (01.C.01)			
28. REMARKS:			

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 LUMP SUM PAYMENT ITEMS
1.1.1 General
1.1.2 Lump Sum Items
1.2 UNIT PRICE PAYMENT ITEMS
1.2.1 General
1.2.2 Unit Price Items
1.3 STANDARD REFERENCES
1.4 EXCAVATION

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section Table of Contents --

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 LUMP SUM PAYMENT ITEMS

1.1.1 General

Payment items for the work of this contract for which contract lump sum payments will be made are listed in the BIDDING SCHEDULE and described below. All costs for items of work, which are not specifically mentioned to be included in a particular lump sum or unit price payment item, shall be included in the listed lump sum item most closely associated with the work involved. The lump sum price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, storm water pollution prevention, environmental protection, meeting safety requirements, providing as-built drawings, tests and reports, and for performing all work required for which separate payment is not otherwise provided.

1.1.2 Lump Sum Items

a. "Mobilization and Demobilization"

(1) Payment will be made for costs associated with mobilization and demobilization, as defined in Section 00800 SPECIAL CONTRACT REQUIREMENTS, paragraph PAYMENT FOR MOBILIZATION AND DEMOBILIZATION.

(2) Unit of measure: lump sum.

b. "Clearing and Grubbing"

(1) Payment will be made for all costs associated with clearing and grubbing (including vegetation removal) of the areas specified herein or indicated on the drawings, removing and disposing of all cleared and grubbed materials, filling holes resulting from clearing and grubbing operations, placing embankment to replace earthen materials removed as a result of clearing and grubbing operations, and all work incidental thereto.

(2) Unit of measure: lump sum.

c. "Turfing"

(1) Payment will be made for all costs associated with establishment of new turf, and all work incidental thereto.

(2) Unit of measure: lump sum.

d. "Erosion Control"

(1) Payment will be made for all costs associated with operations

necessary for erosion control, including dressing, seeding, fertilizing, mulching, and all work incidental thereto.

(2) Unit of measure: lump sum.

e. "Ramps and Road Crossings"

(1) Payment will be made for all costs associated with constructing the levee ramps and ramp crossings; including foundation preparation, excavating, hauling, placing and compacting material; performing all required testing; and all work incidental thereto.

(2) Unit of measure: lump sum.

f. "Drainage Structure, Item 1D, Sta. 0+560.97"

(1) Payment will be made for all costs associated with constructing the drainage structure, including all work required at the site, and all work incidental thereto. Volumes of embankment 25 meters either side of the centerline of the structure and volumes of the lime treatment at the structure site will be included in the contract lump sum price for the drainage structure.

(2) Unit of measure: lump sum.

g. "Drainage Structure, Item 1D, Sta. 2+119.50"

(1) Payment will be made for all costs associated with constructing the drainage structure, including all work required at the site, and all work incidental thereto. Volumes of embankment 15 meters either side of the centerline of the structure will be included in the contract lump sum price for the drainage structure.

(2) Unit of measure: lump sum.

h. "Inlet Structure, Item 1C, Near Sta. 0+150"

(1) Payment will be made for all cost associated with constructing the inlet structure including all work required at the site except work associated with the 1500 mm CMP, which will be paid for under the unit price item "Corrugated Metal Pipe, 1500 mm, Item 1C".

(2) Unit of measure: lump sum.

i. "Riprap, Item 1C"

(1) Payment will be made for all costs associated with furnishing, transporting, and placing the stone in the riverside ditch; and all work incidental thereto.

(2) Unit of measure: lump sum.

j. "Engineering Fabric, Item 1C"

(1) Payment will be made for all costs associated with furnishing

and installing the engineering fabric, and all work incidental thereto.

(2) Unit of measure: lump sum.

1.2 UNIT PRICE PAYMENT ITEMS

1.2.1 General

Payment items for the work of this contract on which the contract unit price payments will be made are listed in the BIDDING SCHEDULE and described below. The unit price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, storm water pollution prevention, environmental protection, meeting safety requirements, providing as-built drawings, tests and reports, and for performing all work required for each of the unit price items.

1.2.2 Unit Price Items

a. "Compacted Fill, Closure Item 1D"

(1) Payment will be made for all costs associated with compacted fill for the closure, which includes performing all operations necessary for foundation preparation, excavating, hauling, placing, and compacting the material, including moisture control for the material.

(2) Compacted fill will be measured for payment by the cubic meter and quantities will be determined by the the Government. The basis for measurement will be the cross section of the areas to be filled taken by the Government prior to clearing and grubbing operations, and the theoretical gross cross section from the grades, side slopes, crown widths, and other dimensions shown or specified with the following limitation: Material for filling holes resulting from grubbing operations, and fill to replace earthen material removed as a result of clearing and grubbing operations, will not be measured for payment.

(3) Unit of measure: cubic meter.

b. "Uncompacted Fill, Closure Item 1D"

(1) Payment will be made for all costs associated with that part of the closure which is uncompacted fill, which includes performing all operations necessary for excavating, hauling, and placing the material, including additional material placed by reason of soft material in the foundation of the closure being forced outward from the section during construction.

(2) Uncompacted fill will be measured for payment the same as unit price bid item "Compacted Fill". The basis for measurement of fill which replaces soft material in the foundation of the closure which is forced outward from the section will be a survey of the area outside the closure toe taken by the Government prior to the filling operations and second survey of the same area taken by the Government after completion of the filling operations.

(3) Unit of measure: cubic meter.

c. "Soft Material Excavation, Closure Item 1D"

(1) Payment will be made for all costs associated with the soft material excavation for the closure, which includes performing the required excavation and operations incidental thereto, and disposition of excavated material, including excess excavated material.

(2) Soft material excavation will be measured for payment based upon the theoretical quantity between the soft material surface, as determined by a Government survey made immediately prior to the commencement of the excavation, and a Government survey made after the soft material has been sufficiently excavated as determined by the Contracting Officer. No allowance will be made for overdepth excavation or for the removal of any material outside the required slope lines unless authorized.

(3) Unit of measure: cubic meter.

d. "Graded Stone "C", Closure Item 1D"

(1) Payment will be made for all costs for furnishing,transporting, stockpiling (if applicable), placing and constructing the stone as specified. Deductions will be made from the payment if the stone cannot be placed due to being contaminated with soil, dirt or refuse.

(2) Riprap shall be measured for payment by the metric ton by weighing each truckload to the nearest 0.1 metric ton, and the final quantity of the whole sum will be rounded to the nearest whole metric ton. The stone shall be measured for payment by being weighed by the Contractor on approved scales before being placed in the work. Quarry weights will not be accepted. Scales shall be of sufficient length to permit simultaneous weighing all axle loads and shall be inspected, tested and sealed as directed to assure accuracy with 0.5 percent throughout the range of the scales. The scales, located at the site of the work, shall be certified as to accuracy by an acceptable scales company representative prior to weighing any stone. Scales will be checked and certified before stone hauling and rechecked and recertified whenever a variance is suspected. The Contractor shall furnish the scales. If commercial scales are readily available in close proximity (15 kilometers) of site of work, the Contracting Officer may approve the use of the scales. The stone shall be weighed in the presence of the Government representative. The Contracting Officer may elect to accept certified weight certificates furnished by a public weigh master in lieu of scale weights at the jobsite.

(3) Unit of measure: metric ton

e. "Levee Embankment, Semicompacted"

(1) Payment for all semicompacted fill material (not including volumes occupied by the structure and closure) placed as required in levee embankments, fill and backfill, including filling of existing ditches, will be made at the contract unit price per

cubic meter for "Levee Embankment, Semicompacted" as indicated and specified, which price and payment shall constitute full compensation for foundation preparation, excavating, hauling, placing, compacting, and dressing the material, and performing all required testing, and all work incidental thereto.

(a) If the Contractor elects to use settlement gages, the cost of furnishing, installing, and maintaining during embankment construction the settlement gages specified in Section 02230 EMBANKMENT, paragraph SETTLEMENT GAGES, including measurements required to be made by the Contractor, shall be at the expense of the Contractor. No separate payment will be made for additional effort required for compaction of fill around and over the settlement gages or for interference with the Contractor's operations resulting from the settlement gage installations.

(b) If the Contractor elects to use settlement gages, failure to utilize settlement gages in strict accordance with the specifications and drawings will result in a total forfeiture of any payment which may otherwise be due the Contractor for settlement of the foundation. In each case of (1) failure to recover any settlement gage, (2) construction of embankment over a settlement gage in excess of specified construction lines plus the tolerance permitted in Section 02230 EMBANKMENT, paragraph GRADE TOLERANCES, or (3) failure to comply with the 72 hour requirement for determining gage elevations as specified in Section 02230 EMBANKMENT, paragraph SETTLEMENT OF FOUNDATION, payment will be totally forfeited for the reach attributable to each gage so affected.

(2) Unless otherwise specified, semicompacted fill, and required fill and backfill materials of any description specified in Section 02230 EMBANKMENT, will be measure for payment by the cubic meter, and quantities will be determined by the Government. The basis for the measurement will be cross sections of the areas to be filled taken by the Government prior to clearing, grubbing, and vegetation removal operations and the theoretical gross section of the completed embankment constructed within the specified tolerance. Quantity computations will be computed using the surface to surface method.

(i) Volumes occupied by drainage structure, structure backfill, and levee embankment 25 meters either side of the centerline of structure will be included in the contract lump sum price for the drainage structure.

(ii) Volumes occupied by ramps and road crossings indicated on the drawings will not be included in measurement of embankment for payment, but will be included in the lump sum price for "Ramps and Road Crossings".

(iii) Volumes occupied by the closure, measured from top bank to top bank of Little Haha Bayou and as shown on the drawings, will be included in the contract unit price for "Compacted Fill, Closure Item 1D" and "Uncompacted Fill, Closure Item 1D".

(3) Unit of measure: cubic meters.

f. "Levee Surfacing, Option A - Sand-Clay-Gravel" or "Levee Surfacing,

Option B - Crushed Stone"

(1) Payment will be made for all costs associated with constructing the new sand-clay-gravel surfacing or crushed stone surfacing on the levee crown, ramps and ramp crossings. That price and payment shall constitute full compensation for furnishing, hauling, placing, spreading, compacting and dressing the finished surfacing; furnishing scales and weighing for measurement; and all work incidental thereto.

(2) Surfacing material shall be measured for payment by being weighed by the Contractor on approved scales before being placed into the work. Each truck load shall be weighed to the nearest 0.1 ton and the final quantity rounded to the nearest whole ton. The Contractor shall furnish the scales and shall weigh the surfacing material in the presence of the Government representative, who will certify to the correctness thereof. Scales shall be of sufficient length to permit simultaneous weighing of all axle loads and shall be inspected, tested and sealed as directed by the Contracting Officer to assure an accuracy within 0.5 percent throughout the range of the scales. The scale's accuracy shall be checked and certified by an acceptable scales company representative prior to weighing any surfacing material and rechecked and recertified whenever a variance is suspected. The scales shall be located at the site of work. If commercial scales are readily available in close proximity (within 16 kilometers) of site of work, the Contracting Officer may approve the use of the scales. The Contracting Officer may elect to accept certified weight certificates furnished by a public weigh master in lieu of scale weights at the jobsite. Quarry weights will not be accepted.

(3) Unit of measure: metric ton.

g. "Corrugated Metal Pipe, 1200 mm, Item 1D"

(1) Payment will be made for all costs associated with constructing the 1200 mm corrugated metal pipe culverts, including excavation, furnishing and installing the pipe culverts complete, backfill, control of water, and all work incidental thereto.

(2) Measurement for pipe culvert will be made by the linear meter, measured from inlet to outlet of each pipe to the nearest 25 millimeters.

(3) Unit of measure: linear meter.

h. "Corrugated Metal Pipe, 1500 mm, Item 1C"

(1) Payment will be made for all costs associated with constructing the 1500 mm corrugated metal pipe culverts, including excavation, furnishing and installing the pipe culverts complete, backfill, control of water, and all work incidental thereto.

(2) Measurement for pipe culvert will be made by the linear meter, measured from inlet to outlet of each pipe to the nearest 25 millimeters.

(3) Unit of measure: linear meter.

1.3 STANDARD REFERENCES

References in the specifications and/or drawings to the Louisiana Department of Transportation and Developments "Standard Specifications for Roads and Bridges" do not refer to payment in the referenced sections or subsections. Measurement and payment shall be as specified, herein.

1.4 EXCAVATION

All costs associated with excavation shall be included in the applicable contract prices listed in the Bid Schedule. No direct payment will be made for excavation except for the item "Soft Material Excavation, Closure Item 1D".

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01090

SOURCES FOR REFERENCE PUBLICATIONS

PART 1 GENERAL

1.1 REFERENCES
1.2 ORDERING INFORMATION

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section Table of Contents --

SECTION 01090

SOURCES FOR REFERENCE PUBLICATIONS

PART 1 GENERAL

1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the sponsoring organization, e.g. UL 1 (1993; Rev thru Jan 1995) Flexible Metal Conduit. However, when the sponsoring organization has not assigned a number to a document, an identifying number has been assigned for convenience, e.g. UL's unnumbered 1995 edition of their Building Materials Directory is identified as UL-01 (1995) Building Materials Directory. The sponsoring organization number (UL 1) can be distinguished from an assigned identifying number (UL-01) by the lack of a dash mark (-) in the sponsoring organization assigned number.

1.2 ORDERING INFORMATION

The addresses of the organizations whose publications are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided. Documents listed in the specifications with numbers which were not assigned by the sponsoring organization should be ordered from the source by title rather than by number.

ACI INTERNATIONAL (ACI)

P.O. Box 9094
Farmington Hills, MI 48333-9094
Ph: 248-848-3800
Fax: 248-848-3801
Internet: http://www.aci-int.org

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

444 N. Capital St., NW, Suite 249
Washington, DC 20001
Ph: 800-231-3475
Fax: 800-525-5562
Internet: www.aashto.org
NOTE: AASHTO documents with numbers beginning with M or T are available only in Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 1998 @$289.00\X

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

11 West 42nd St
New York, NY 10036
Ph: 212-642-4900
Fax: 212-398-0023

Internet: www.ansi.org/
Note: Documents beginning with the letter "S" can be ordered from:
Acoustical Society of America
P. O. Box 1020
Sweickley, PA 15143-9998
Ph: 412-741-1979
Fax: 412-741-0609
Internet:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

100 Barr Harbor Drive
West Conshohocken, PA 19428-2959
Ph: 610-832-9500
Fax: 610-832-9555
Internet: www.astm.org
NOTE: The annual ASTM Book of Standards (66 Vol) is
available for $3500.00. Prices of individual standards vary.

AMERICAN WATER WORKS ASSOCIATION(AWWA)

6666 West Quincy
Denver, CO 80235
Ph: 800-926-7337
Fax: 303-795-1989
Internet: www.awwa.org

AMERICAN WELDING SOCIETY (AWS)

550 N.W. LeJeune Road
Miami, FL 33126
Ph: 305-443-9353
Fax: 305-443-7559
Internet: http://www.amweld.org

ASME INTERNATIONAL (ASME)

Three Park Avenue
New York, NY 10016-5990
Ph: 212-591-7000
Fax: 212-591-7674
Internet: www.asme.org

CODE OF FEDERAL REGULATIONS (CFR)

Order from:
Government Printing Office
Washington, DC 20402
Ph: 202-512-1800
Fax: 202-275-7703
Internet: http://www.pls.com:8001/his/cfr.html

CORPS OF ENGINEERS (COE)

Order from:
U.S. Army Engineer Waterways Experiment Station
ATTN: Technical Report Distribution Section, Services
Branch, TIC
3909 Halls Ferry Rd.

Vicksburg, MS 39180-6199
Ph: 601-634-2571
Fax: 601-634-2506
NOTE: COE Handbook for Concrete and Cement (Documents w/prefix CRD-C) (1949-present; 2 Vol) free to Government offices; $10.00 plus $8.00 per yr for 4 qtrly supplements to others). Individual documents, single copies free. Order from address above.

ENGINEERING MANUALS (EM)

USACE Publications Depot
Attn: CEIM-SP-D
2803 52nd Avenue
Hyattsville, MD 20781-1102
Ph: 301-394-0081

FEDERAL SPECIFICATIONS (FS)

Order from:
General Services Administration
Federal Supply Service Bureau
470 L'Enfant Plaza, S.W.
Washington, DC 20407
Ph: 202-619-8925
Fax: 202-619-8978
Internet: http://pub.fss.gsa.gov/

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

40 24th Street, 6th Floor
Pittsburgh, PA 15222-4656
Ph: 412-281-2331
Fax: 412-281-9992
Internet: www.sspc.org
NOTE: SSPC documents, except as noted otherwise, are available only as a part of the 1995 Steel Structures Painting Manual, 7th Edition @ $115.00.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUBMITTAL DESCRIPTIONS
1.2 SUBMITTAL CLASSIFICATION
1.2.1 Government Approved
1.2.2 Information Only
1.3 APPROVED SUBMITTALS
1.4 DISAPPROVED SUBMITTALS
1.5 WITHHOLDING OF PAYMENT

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL
3.2 SUBMITTAL REGISTER (ENG FORM 4288)
3.3 SCHEDULING
3.4 TRANSMITTAL FORM (ENG FORM 4025-R)
3.5 SUBMITTAL PROCEDURE
3.5.1 Procedures
3.5.2 Deviations
3.6 CONTROL OF SUBMITTALS
3.7 GOVERNMENT APPROVED SUBMITTALS
3.8 INFORMATION ONLY SUBMITTALS

-- End of Section Table of Contents --

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUBMITTAL DESCRIPTIONS

The submittals described below are those required and further described in other sections of the specifications. Submittals required by the CONTRACT CLAUSES and other non-technical parts of the contract are not included in this section.

SD-01 Data

Submittals which provide calculations, descriptions, or other documentation regarding the work.

SD-04 Drawings

Submittals which graphically show relationship of various components of the work, schematic diagrams of systems, details of fabrication, layouts of particular elements, connections, and other relational aspects of the work.

SD-08 Statements

A document, required of the Contractor, or through the Contractor, by way of a supplier, installer, manufacturer, or other lower tier Contractor, the purpose of which is to further the quality or orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, qualifications, or other verifications of quality.

SD-09 Reports

Reports of inspection and laboratory test, including analysis and interpretation of test results. Test methods used and compliance with recognized test standards shall be described.

SD-13 Certificates

Statement signed by responsible official of a manufacturer of a product, system or material, attesting that the product, system or material meets specified requirements. The statement must be dated after the award of this contract, name the project, and list the specific requirements which it is intended to address.

SD-14 Samples

Samples, including both fabricated and unfabricated physical examples of materials, products, and units of work as complete units or as portions of units of work.

SD-19 Operation and Maintenance Manuals

Data intended to be incorporated in an "Operation and Maintenance Manual."

1.2 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.2.1 Government Approved

Governmental approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause, SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION, they are considered to be "shop drawings."

1.2.2 Information Only

All submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.3 APPROVED SUBMITTALS

The Contracting Officer's approval of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the CQC requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work. After submittals have been approved by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.4 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause CHANGES shall be given promptly to the Contracting Officer.

1.5 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to

submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) representative and each item shall be stamped, signed, and dated by the CQC representative indicating action taken. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

3.2 SUBMITTAL REGISTER (ENG FORM 4288)

At the end of this section is one set of ENG Form 4288 listing items of equipment and materials for which submittals are required by the specifications; this list may not be all inclusive and additional submittals may be required. Columns "d" through "q" have been completed by the Government; the Contractor shall complete columns "a" and "s" through "u" and submit the forms to the Contracting Officer for approval within 10 calendar days after Notice to Proceed. The approved submittal register will become the scheduling document and will be used to control submittals throughout the life of the contract. The submittal register and the progress schedules shall be coordinated.

3.3 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 30 calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals.

3.4 TRANSMITTAL FORM (ENG FORM 4025-R)

The sample transmittal form (ENG Form 4025-R) attached to this section shall be used for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

3.5 SUBMITTAL PROCEDURE

Submittals shall be made as follows:

3.5.1 Procedures

Submittals shall be prepared, as specified, with four (4) copies and the original delivered to the Contracting Officer.

3.5.2 Deviations

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025-R shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

3.6 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

3.7 GOVERNMENT APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. Three (3) copies of the submittal will be retained by the Contracting Officer and one (1) copy of the submittal will be returned to the Contractor.

3.8 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

-- End of Section --

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE *(Read instructions on the reverse side prior to initiating this form)*	DATE	TRANSMITTAL NO.

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS *(This section will be initiated by the contractor)*

TO:	FROM:	CONTRACT NO.	CHECK ONE: ☐ THIS IS A NEW TRANSMITTAL ☐ THIS IS A RESUBMITTAL OF TRANSMITTAL _____
SPECIFICATION SEC. NO. *(Cover only one section with each transmittal)*	PROJECT TITLE AND LOCATION		CHECK ONE: THIS TRANSMITTAL IS FOR ☐ FIO ☐ GOV'T. APPROVAL

ITEM NO. *a.*	DESCRIPTION OF ITEM SUBMITTED *(Type size, model number/etc.)* *b.*	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. *(See instruction no. 8)* *c.*	NO. OF COPIES *d.*	CONTRACT REFERENCE DOCUMENT SPEC. PARA. NO. *e.*	CONTRACT REFERENCE DOCUMENT DRAWING SHEET NO. *f.*	FOR CONTRACTOR USE CODE *g.*	VARIATION *(See instruction No. 6)* *h.*	FOR CE USE CODE *i.*

REMARKS	I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as other wise stated. _____ NAME AND SIGNATURE OF CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED *(List by Item No.)*	NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY	DATE

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.

2. Each transmittal shall be numbered consecutively in the space provided for "Transmittal No.". This number, in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.

3. The "Item No." will be the same "Item No." as indicated on ENG FORM 4288-R for each entry on this form.

4. Submittals requiring expeditious handling will be submitted on a separate form.

5. Separate transmittal form will be used for submittals under separate sections of the specifications.

6. A check shall be placed in the "Variation" column when a submittal is not in accordance with the plans and specifications--also, a written statement to that effect shall be included in the space provided for "Remarks".

7. Form is self-transmittal, letter of transmittal is not required.

8. When a sample of material or Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate" in column c, Section I.

9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in Section I, column i to each item submitted. In addition they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated below in Section I, column g, to each item submitted.

THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

A	--	Approved as submitted.	E	--	Disapproved (See attached).
B	--	Approved, except as noted on drawings.	F	--	Receipt acknowledged.
C	--	Approved, except as noted on drawings. Refer to attached sheet resubmission required.	FX	--	Receipt acknowledged, does not comply as noted with contract requirements.
D	--	Will be returned by separate correspondence.	G	--	Other (*Specify)*

10. Approval of items does not relieve the contractor from complying with all the requirements of the contact plans and specifications.

(Reverse of ENG Form 4025-R)

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Sicily Island Area Levee, Item 1C & 1D

CONTRACTOR

SPECIFICATION SECTION
01356

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			2.2.2	Filter Fabric							X				X											

ENG FORM 4288, Jul 96

SPECSINTACT

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Sicily Island Area Levee, Item 1C & 1D

CONTRACTOR

SPECIFICATION SECTION
02213

ACTIVITY NO a.	TRANS-MITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERN-MENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			2.2.1	Mill Certificates or Affidavits							X				X											
			2.1.1	Fabric								X			X											
			2.1.2	Seams								X			X											

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Sicily Island Area Levee, Item 1C & 1D

CONTRACTOR

SPECIFICATION SECTION
02380

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			2.2.3	Gradation Test						X					X											
			2.2.2	Evaluation Tests						X					X											
			1.3	Riprap							X				X											
			2.2.2	Laboratory							X				X											

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Sicily Island Area Levee, Item 1C & 1D

CONTRACTOR

SPECIFICATION SECTION
02610

					TYPE OF SUBMITTAL										CLASSIFICATION			CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	CODE y.	DATE z.	REMARKS aa.
			2.1	Corrugated Steel Sheeting							X				X											

ENG FORM 4288, Jul 96 SPECSINTACT

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Sicily Island Area Levee, Item 1C & 1D

CONTRACTOR

SPECIFICATION SECTION
02707

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	CLASSIFICATION: GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			2.1	Materials	X											X										
			1.2	Shop Drawings		X										X										
			3.3	Pressure Testing						X						X										
			3.3	Pressure Testing						X						X										
			2.1.1	Lined and Embedded Cylinder							X				X											
				Concrete Pressure Pipe																						

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Sicily Island Area Levee, Item 1C & 1D

CONTRACTOR

SPECIFICATION SECTION
02714

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	CLASSIFICATION: GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	System Description					X							X										
			3.2	Initial Testing						X					X											

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Sicily Island Area Levee, Item 1C & 1D

CONTRACTOR

SPECIFICATION SECTION
02719

					TYPE OF SUBMITTAL										CLASSIFICATION			CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	CODE y.	DATE z.	REMARKS aa.
			2.1.1	Corrugated Metal Pipe							X				X											

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Sicily Island Area Levee, Item 1C & 1D

CONTRACTOR

SPECIFICATION SECTION
02821

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	CLASSIFICATION: GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.2	Chain Link Fence							X					X										

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Sicily Island Area Levee, Item 1C & 1D

CONTRACTOR

SPECIFICATION SECTION
02933

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	CLASSIFICATION: GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.7	Bermuda Grass Cultivar	X											X										
			1.7	Sampling and Testing						X					X											
			2.1	Fertilizer							X				X											
			2.3	Lime							X				X											
			2.5.2	Bermuda grass Sprigs							X				X											
			2.5.3	Bermuda Grass Seed							X				X											

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Sicily Island Area Levee, Item 1C & 1D

CONTRACTOR

SPECIFICATION SECTION
02960

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			2.1	Fertilizer	X										X											

ENG FORM 4288, Jul 96

SPECSINTACT

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Sicily Island Area Levee, Item 1C & 1D

CONTRACTOR

SPECIFICATION SECTION
02961

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			2.1	Hydrated Lime							X				X											

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Sicily Island Area Levee, Item 1C & 1D

CONTRACTOR

SPECIFICATION SECTION
03101

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	CLASSIFICATION: GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			2.1	Materials	X										X											
			1.4	Shop Drawings		X									X											
			1.4	Shop Drawings					X						X											
			3.3	Inspection						X					X											
			1.3	Formwork Not Supporting Weight of						X						X										
				Concrete																						

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Sicily Island Area Levee, Item 1C & 1D

CONTRACTOR

SPECIFICATION SECTION
03307

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			2.1.3.1	Air-Entraining Admixture	X										X											
			2.1.3.2	Accelerating Admixture	X										X											
			2.1.3.3	Water-Reducing or Retarding	X										X											
				Admixture																						
			2.1.7	Curing Materials	X										X											
			2.1.5	Reinforcing Steel	X										X											
			2.1.6	Waterstops	X										X											
			3.1.3.3	Batching and Mixing Equipment	X										X											
			3.2	Conveying and Placing Concrete	X										X											
			2.1.2	Aggregates						X					X											
			1.2.3	Concrete Mixture Proportions						X					X											
			2.1.1	Cementitious Materials							X				X											
			2.1.2	Aggregates							X				X											

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION
Sicily Island Area Levee, Item 1C & 1D

CONTRACTOR

SPECIFICATION SECTION
05500

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	CLASSIFICATION: GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	CONTRACTOR ACTION: DATE w.	SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	GOVERNMENT ACTION: DATE z.	REMARKS aa.
			1.2	Miscellaneous Metal Items		X										X										

SUBMITTAL REGISTER
(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION

Sicily Island Area Levee, Item 1C & 1D

CONTRACTOR

SPECIFICATION SECTION

15151

ACTIVITY NO a.	TRANSMITTAL NO. b.	ITEM NO c.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	TYPE OF SUBMITTAL: DATA f.	DRAWINGS g.	INSTRUCTIONS h.	SCHEDULES i.	STATEMENTS j.	REPORTS k.	CERTIFICATES l.	SAMPLES m.	RECORDS n.	O&M MANUALS o.	CLASSIFICATION: INFORMATION ONLY p.	CLASSIFICATION: GOVERNMENT APPROVED q.	REVIEWER r.	CONTRACTOR SCHEDULE DATES: SUBMIT s.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY u.	CONTRACTOR ACTION: CODE v.	DATE w.	SUBMIT TO GOVERNMENT x.	GOVERNMENT ACTION: CODE y.	DATE z.	REMARKS aa.
			1.8.2	Design Data and Computations	X										X											
			1.2.1	Standard Products	X										X											
			1.8.1	Shop Drawings		X										X										
			1.4	Delivery, Storage and Handling					X							X										
			2.2	Equipment					X						X											
			3.1.2	Erecting Engineer					X							X										
			1.6.1	Hoist Lubricants					X						X											
			3.2.1.1	Hoist Lubricants					X						X											
			1.7	Materials and Equipment							X				X											
			2.1	Materials								X				X										
			1.9	Gate and Hoist										X	X											

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01354

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 DEFINITIONS
1.2 ENVIRONMENTAL PROTECTION REQUIREMENTS
1.2.1 Environmental Protection Plan
1.2.1.1 Protection of Features
1.2.1.2 Procedures
1.2.1.3 Permit or License
1.2.1.4 Drawings
1.2.1.5 Recycling and Waste Prevention Plan
1.2.1.6 Environmental Monitoring Plans
1.2.1.7 Traffic Control Plan
1.2.1.8 Surface and Ground Water
1.2.1.9 Noise Intrusion
1.2.1.10 Work Area Plan
1.2.1.11 Plan of Borrow Area(s)
1.2.1.12 Contaminant Prevention Plan
1.2.1.13 Storm Water Pollution Prevention Plan
1.3 ENVIRONMENTAL LITIGATION

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 PROTECTION OF ENVIRONMENTAL RESOURCES
3.1.1 Protection of Land Resources
3.1.1.1 Work Area Limits
3.1.1.2 Protection of Landscape
3.1.1.3 USDA Quarantined Considerations
3.1.1.4 Location of Contractor On-Site Facilities
3.1.1.5 Borrow Areas
3.1.1.6 Disposal Areas on Government Property
3.1.1.7 Disposal of Solid Wastes
3.1.1.8 Disposal of Hazardous Wastes
3.1.1.9 Disposal of Discarded Materials
3.1.1.10 Disposal of Waste Oils
3.1.2 Historical, Archaeological and Cultural Resources
3.1.3 Protection of Water Resources
3.1.3.1 Waste Water
3.1.3.2 Monitoring of Water Areas Affected by Construction Activities
3.1.4 Protection of Aquatic and Wildlife Resources
3.1.5 Protection of Air Resources
3.1.5.1 Particulates
3.1.5.2 Hydrocarbons and Carbon Monoxide

3.1.5.3 Volatile Organic Compound (VOC)
3.1.5.4 Odors
3.1.5.5 Monitoring Air Quality
3.2 NONCOMPLIANCE
3.3 CONTAINMENT AND CLEANUP OF CONTAMINANT RELEASES
3.4 POST CONSTRUCTION CLEANUP
3.5 RESTORATION OF LANDSCAPE DAMAGE
3.6 MAINTENANCE OF POLLUTION FACILITIES
3.7 TRAINING OF CONTRACTOR PERSONNEL IN POLLUTION CONTROL

-- End of Section Table of Contents --

SECTION 01354

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 DEFINITIONS

Environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents that adversely affect human health or welfare; unfavorably alter ecological balances of importance to life; or degrade the environment for aesthetic, cultural or historical purposes. Environmental protection is the prevention and/or control of pollution that develops during normal construction practice. The control of environmental pollution and damage requires consideration of air, water, soil, and land resources; and includes management of visual aesthetics; noise; solid, chemical, and liquid waste; radiant energy and radioactive materials; and other pollutants.

1.2 ENVIRONMENTAL PROTECTION REQUIREMENTS

A plan shall be developed to provide for environmental protective measures to prevent and/or control pollution that may develop during construction. The plan shall contain protective measures required to prevent or correct conditions that may develop during the construction. The liability for environmental noncompliance shall be borne by the Contractor.

1.2.1 Environmental Protection Plan

Within 15 days after receipt of Notice of Award of the contract and at least 7 days prior to the Preconstruction Conference, the Contractor shall submit in writing an Environmental Protection Plan. No physical work at the site shall begin until the Contracting Officer has approved the plan and provided specific authorization to start a phase of the work. Preparation and submittal of supplemental plan(s) may be necessary for later phases of work. A copy of the complete Environmental Protection Plan shall be maintained on-site at all times during the life of the contract. The environmental protection plan shall include but not be limited to the following.

1.2.1.1 Protection of Features

In accordance with Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS, the Contractor shall develop methods for the protection of features to be preserved within authorized work areas. The Contracting Officer will prepare a list of resources needing protection and preservation (i.e., trees, shrubs, vines, grasses and ground cover, landscape features, air quality, noise levels, surface and ground water quality, fish and wildlife, soil, historic, archaeological and cultural resources). The Contractor's plan shall identify methods to protect these and other resources present and specify measures to protect the environment should an accident, natural causes of pollution, or failure to follow the environmental protection plan occur during construction. The Contractor's plan shall specify how the quality and protective measures of these resources shall be monitored. Furthermore the Contractor's plan shall specify how and where waste shall be disposed.

1.2.1.2 Procedures

The Contractor shall implement procedures to provide the required environmental protection and to comply with the applicable laws and regulations. The Contractor shall set out the procedures to be followed to correct pollution of the environment due to accident, natural causes or failure to follow the procedures set out in accordance with the environmental protection plan.

1.2.1.3 Permit or License

Notwithstanding the Contract Clause PERMITS AND RESPONSIBILITIES, the Government will obtain a National Pollution Discharge Elimination System (NPDES) Permit for storm water discharges from construction activities. The Contractor shall obtain all other needed permits or licenses. The Contractor shall be responsible for complying with all permits and licenses throughout the duration of this contract.

1.2.1.4 Drawings

The Contractor shall include drawings identifying the areas of limited use or nonuse and show locations of any proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, stockpiles of earth materials, and disposal areas for excess earth material and unsuitable earth materials.

1.2.1.5 Recycling and Waste Prevention Plan

The Contractor shall submit as a part of the Environmental Protection Plan, a Recycling and Waste Prevention Plan.

1.2.1.6 Environmental Monitoring Plans

The Contractor shall include environmental monitoring plans for the job site which incorporate land, water, air and noise monitoring.

1.2.1.7 Traffic Control Plan

The Contractor shall include a traffic control plan for the job site. This plan shall focus on reducing erosion of temporary roadbeds by construction traffic, especially during wet weather, and reducing the amount of mud transported onto paved public roads by motor vehicles or runoff.

1.2.1.8 Surface and Ground Water

The Contractor shall establish methods of protecting surface and ground water during construction activities. These water courses shall be protected from pollutants such as petroleum products, fuels, oils, lubricants, bentonite, bitumens, calcium chloride, acids, waste washings, sewage, chlorinated solutions, herbicides, insecticides, lime, wet concrete, cement, silt, or organic or other deleterious material. Chemical emulsifiers, dispersants, coagulants, or other cleanup compounds shall not be used without prior written approval from the Contracting Officer. Waters used to wash equipment shall be disposed to prevent entry into a waterway until treated to an acceptable quality. Fuels, oils, greases, bitumens, chemicals, and other nonbiodegradable materials shall be contained with total containment systems and removed from the site for disposal in an approved manner.

1.2.1.9 Noise Intrusion

The Contractor shall exercise controls to minimize damage to the environment by noise from construction activities. All Contractor's, subcontractors', and suppliers' equipment used on or in the vicinity of the job site shall be equipped with noise suppression devices. Equipment not so suppressed and properly maintained must be approved for use in writing by the Contracting Officer. Areas that have noise levels greater than 85 dB continuous or 140 dB peak (unweighted) impulse must be designated as noise hazardous areas. These work areas must have caution signs displayed at the perimeter of the noise area indicating the presence of hazardous noise levels and requiring the use of hearing protection devices.

1.2.1.10 Work Area Plan

The Contractor shall include a work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. The plan shall include measures for marking the limits of use areas.

1.2.1.11 Plan of Borrow Area(s)

The Contractor shall include a plan of borrow area(s) for the project.

1.2.1.12 Contaminant Prevention Plan

The Contractor shall identify potentially hazardous substances to be used on the job site and intended actions to prevent accidental or intentional introduction of such materials into the air, water or ground. The Contractor shall detail provisions to be taken regarding the storage and handling of these materials. The plan shall include, but not be limited to, plans for preventing polluted runoff from plants, parked equipment, and maintenance areas from entering local surface and ground water sources.

1.2.1.13 Storm Water Pollution Prevention Plan

As required in Section 01356 STORM WATER POLLUTION PREVENTION PLAN, the Contractor shall address the impact of construction upon erosion of the earth's surface and the introduction of pollutants into water courses. The Storm Water Pollution Prevention Plan shall include the Contractor's plan for controlling pollution, sediment and soil erosion and for disposing of wastes. The plan shall identify all temporary and permanent erosion and sediment control measures adopted such as soil stabilization, seeding, mulching, sprinkling, ditching, diking, draining, and constructing sedimentation basins, silt fences, straw bales and diversion ditches.

1.3 ENVIRONMENTAL LITIGATION

a. If the performance of all or any part of the work is suspended, delayed, or interrupted due to an order of a court of competent jurisdiction as a result of environmental litigation, as defined below, the Contracting Officer, at the request of the Contractor, shall determine whether the order is due in any part to the acts or omissions of the Contractor, or a Subcontractor at any tier, not required by the terms of the contract. If it is determined that the order is not due in any part to acts or omissions of the Contractor, or a Subcontractor at any tier, other than as required by the terms of this contract, such suspension, delay, or interruption shall be considered as if ordered by

the Contracting Officer in the administration of this contract under the terms of the SUSPENSION OF WORK clause of this contract. The period of such suspension, delay, or interruption shall be considered unreasonable, and an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) as provided in that clause, subject to all the provisions thereof.

b. The term "Environmental Litigation", as used herein, means a lawsuit alleging that the work will have an adverse effect on the environment or that the Government has not duly considered, either substantively or procedurally, the effect of the work on the environment.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 PROTECTION OF ENVIRONMENTAL RESOURCES

The Contractor shall protect the environmental resources (such as, but not limited to, historic, archaeological and cultural resources; land, water, and air resources; and fish and wildlife resources) within the project boundaries and those affected outside the limits of permanent work under this contract.

3.1.1 Protection of Land Resources

In accordance with Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS, the land resources within the project boundaries and those affected outside the limits of work under this contract shall be preserved in their present condition or be restored to an equivalent condition upon completion of the work. Prior to initiating any construction, the Contractor shall identify all land resources to be preserved within the work area, including those identified by the Contracting Officer. The Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and landforms without permission from the Contracting Officer unless otherwise specified. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. Where such special emergency use is permitted, the Contractor shall provide effective protection for land and vegetation resources at all times and shall be responsible for any subsequent damage as defined in the following subparagraphs.

3.1.1.1 Work Area Limits

Prior to any construction, the Contractor shall mark the areas within the designated work areas that are not required to accomplish work to be performed under this contract and which are to be protected. Isolated areas within the general work area which are to be saved and protected shall be marked or fenced. Monuments and markers shall be protected during construction. Where construction operations are to be conducted during darkness, the markers shall be visible. The Contractor shall convey to his personnel the purpose of marking and protecting all necessary objects.

3.1.1.2 Protection of Landscape

Trees, shrubs, vines, grasses, landforms and other landscape features, indicated and defined on the drawings to be preserved shall be clearly

identified by marking, fencing, or wrapping with boards, or any other approved techniques.

3.1.1.3 USDA Quarantined Considerations

See Section 01000 GENERAL CONTRACT REQUIREMENTS, paragraph WORK IN QUARANTINED AREA.

3.1.1.4 Location of Contractor On-Site Facilities

The Contractor's on-site field offices, staging areas, stockpile storage, and temporary buildings shall be placed in approved areas. Temporary movement or relocation of Contractor on-site facilities shall be only on approval by the Contracting Officer.

3.1.1.5 Borrow Areas

Borrow areas shall be managed by the Contractor to minimize erosion and to prevent sediment from entering nearby water courses or lakes, or affecting known or discovered cultural resource properties.

3.1.1.6 Disposal Areas on Government Property

Material disposal on government property shall be limited to those areas as specified in Section 02111 CLEARING AND GRUBBING, paragraph BURYING, and Section 02222 EXCAVATION, paragraph UNSUITABLE MATERIALS. The specified disposal areas shall be managed and controlled to prevent erosion of soil or sediment from entering nearby water courses or lakes. Special emphasis is placed on avoiding impacts to wetlands. Disposal areas shall be developed and managed in accordance with the grading plan indicated on the contract drawings or as approved.

3.1.1.7 Disposal of Solid Wastes

Solid wastes (not including clearing debris) shall be any waste excavated or generated by the Contractor. Solid waste shall be placed in containers and disposed on a regular schedule. All handling and disposal shall be conducted to prevent spillage and contamination. The Contractor shall transport all solid waste off government property and dispose properly. The Contractor shall participate in any State or local recycling programs to reduce the volume of solid waste materials at the source whenever practical.

3.1.1.8 Disposal of Hazardous Wastes

Hazardous waste shall be stored, removed from the work area, and disposed of in accordance with all applicable Federal, State, and local laws and regulations. Hazardous waste shall not be dumped onto the ground, into storm sewers or open water courses, or into the sanitary sewer system. Fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spills and evaporation.

3.1.1.9 Disposal of Discarded Materials

Discarded materials that cannot be included in the solid waste category shall be handled as approved.

3.1.1.10 Disposal of Waste Oils

Waste oils and/or lubricants shall be disposed of in accordance with all Federal, State, and local laws and regulations. The Contractor shall collect waste oil and/or lubricants in leak-tight containers, ensure that all openings on the containers are tightly sealed (including the drum ring and bung closures), and label the containers to clearly indicate contents. Disposal through a waste oil recycler is required. The Contractor shall ensure that the recycler has all appropriate State and Federal permits.

3.1.2 Historical, Archaeological and Cultural Resources

The Contractor shall take precautions to preserve existing historical, archaeological and cultural resources. The Contractor shall install protection for these resources and shall be responsible for their preservation during this contract. If during construction activities the Contractor observes items that may have archaeological or historic value (e.g., when Native American human remains and associated objects are discovered), the Contractor shall stop work in the area, leave the items undisturbed, and immediately report the find to the Contracting Officer. Such items may include historic artifacts of glass, metal and ceramics, or prehistoric artifacts such as stone tools, ceramics, bone, and shell. The Contractor shall not judge the potential significance of any suspected cultural material, but shall report all findings to the Contracting Officer.

3.1.3 Protection of Water Resources

The Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters. All construction activities shall meet the requirements of the National Pollutant Discharge Elimination System (NPDES) General Permits for Storm Water Discharges from Construction Sites. Discharges of any pollutant into the water courses is strictly prohibited, unless excepted by the Contracting Officer.

3.1.3.1 Waste Water

Waste water directly derived from washing equipment, curing concrete, cleaning joints, or any other construction activities shall not be discharged into natural water areas.

3.1.3.2 Monitoring of Water Areas Affected by Construction Activities

The Contractor shall be responsible for monitoring all water areas affected by construction activities. In the event that water quality violations result from the Contractor's operation, the Contractor shall suspend the operation or operations causing the pollution, and such suspension shall not form the basis for a claim against the Federal government.

3.1.4 Protection of Aquatic and Wildlife Resources

The Contractor shall keep construction activities under surveillance, management, and control to prevent interference with, disturbance to, and damage to aquatic resources and/or wildlife. Species that require specific attention as defined by law or specified by the Contracting Officer, along with measures for their protection, shall be listed by the Contractor prior to beginning of construction operations.

3.1.5 Protection of Air Resources

The Contractor shall keep construction activities under surveillance, management and control to minimize pollution of air resources. Special management techniques as set out below shall be implemented to control air pollution by the construction activities.

3.1.5.1 Particulates

Dust particles, aerosols, and gaseous by-products from all construction activities, disturbed areas, and/or processing and preparation of materials, such as from asphaltic batch plants, shall be controlled at all times, including weekends, holidays, and hours when work is not in progress. The Contractor shall maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, disposal sites, borrow areas, and all other work areas within or outside the project boundaries free from particulates which would cause air pollution standards specified in paragraph PROTECTION OF AIR RESOURCES to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, light bituminous treatment, baghouse, scrubbers, electrostatic precipitators, or other methods will be permitted to control particulates in the work area. Sprinkling shall be repeated at such intervals as to keep the disturbed area damp at all times.

3.1.5.2 Hydrocarbons and Carbon Monoxide

Hydrocarbons and carbon monoxide emissions from equipment shall be controlled to Federal, State, and local allowable limits at all times.

3.1.5.3 Volatile Organic Compound (VOC)

The Contractor shall comply with Federal, State, and local laws and regulations pertaining to emission of VOC vapors at all times.

3.1.5.4 Odors

Odors shall be controlled at all times for all construction activities, including processing and preparation of materials.

3.1.5.5 Monitoring Air Quality

Monitoring of air quality at the construction site(s) shall be the responsibility of the Contractor.

3.2 NONCOMPLIANCE

If the Contracting Officer notifies the Contractor in writing of any observed noncompliance with contract requirements or Federal, State, or local laws, regulations, or permits, the Contractor shall take all necessary action to correct the noncompliance. Such notice, when delivered to the Contractor at the worksite, shall be deemed sufficient for the purpose of notification. If the Contractor fails to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action is taken. No time extensions will be granted or costs or damage allowed to the Contractor for any such suspension. (See also the Contract Clause PERMITS AND RESPONSIBILITIES.)

3.3 CONTAINMENT AND CLEANUP OF CONTAMINANT RELEASES

The Contractor shall provide the Contracting Officer for approval, a contaminant containment and cleanup plan including the procedures,

instructions, and reports to be used in the event of an unforeseen substance release. This plan shall include as a minimum:

a. The name of the individual who will be responsible for implementing and supervising the containment and cleanup.

b. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.

c. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material placement equipment available in case of an unforeseen spill emergency.

d. The methods and procedures to be used for expeditious contaminant cleanup.

e. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual shall immediately notify the Contracting Officer in addition to the legally required reporting channels when a reportable quantity spill of oil or hazardous substance occurs.

3.4 POST CONSTRUCTION CLEANUP

The Contractor shall clean up areas used for construction and remove all signs of temporary construction facilities; Contractor office, storage and staging areas; quarry and borrow areas, and all other areas used by the Contractor during construction. Furthermore, the disturbed areas shall be graded and filled as approved by Contracting Officer. Restoration of original contours is not required unless specified in another section. (See also the Contract Clause CLEANING UP.)

3.5 RESTORATION OF LANDSCAPE DAMAGE

All landscape features damaged or destroyed during construction operations that were not identified for removal shall be restored. Any vegetation or landscape feature damaged shall be restored as nearly as possible to its original condition. (See also the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS.)

3.6 MAINTENANCE OF POLLUTION FACILITIES

The Contractor shall maintain all constructed facilities and portable pollution control devices for the duration of the contract or for the length of time construction activities create the particular pollutant.

3.7 TRAINING OF CONTRACTOR PERSONNEL IN POLLUTION CONTROL

Contractor personnel shall be trained in environmental protection and conduct environmental protection meetings monthly. The training and meeting agenda shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, and installation and care of facilities (vegetative covers, and instruments required for monitoring purposes) to insure adequate and continuous environmental pollution control. Personnel are to be informed of provisions for hazardous and toxic materials container labeling and for managing Material Safety Data Sheets (MSDS). Anticipated hazardous or

toxic chemicals shall also be reviewed. Other items to be discussed shall include recognition and protection of archaeological sites and artifacts. The Contractor shall include training topics discussed and attendance as a part of his daily CQC Report.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01356

STORM WATER POLLUTION PREVENTION PLAN

PART 1 GENERAL

1.1 REFERENCES
1.2 SYSTEM DESCRIPTION
1.2.1 Permit Notifications
1.2.2 Notice of Intent
1.2.3 Notice of Termination
1.2.4 Permit Notice
1.3 SUBMITTALS
1.4 SITE DESCRIPTION
1.4.1 Nature of Construction Activity
1.4.2 Major Activities Which Disturb Soils
1.4.3 Estimated Areas Affected
1.4.4 Runoff Coefficient
1.4.5 Contract Drawings and Specifications
1.4.6 Waters Affected
1.5 CONTROLS
1.5.1 Erosion and Sediment Controls
1.5.1.1 Stabilization Practices
1.5.1.2 Structural Practices
1.5.2 Storm Water Management
1.5.2.1 Management Practices
1.5.2.2 Methods
1.5.3 Other Controls
1.5.3.1 Waste Disposal
1.5.3.2 Off-site Vehicle Tracking
1.5.3.3 Compliance with Regulations

PART 2 PRODUCTS

2.1 FILTER FABRIC FOR SILT SCREEN FENCE
2.2 ACCEPTANCE REQUIREMENTS
2.2.1 General
2.2.2 Mill Certificates or Affidavits
2.2.3 Testing
2.3 IDENTIFICATION, STORAGE AND HANDLING

PART 3 EXECUTION

3.1 MAINTENANCE
3.2 INSPECTIONS
3.2.1 General
3.2.2 Field Inspections
3.2.3 Inspection Reports
3.2.4 Revisions to the Plan

SECTION 01356

STORM WATER POLLUTION PREVENTION PLAN

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3786	(1987) Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics - Diaphragm Bursting Strength Tester Method
ASTM D 4354	(1996) Sampling of Geosynthetics for Testing
ASTM D 4439	(1998) Geosynthetics
ASTM D 4491	(1996) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(1991; R 1996) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991; R 1996) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(1995) Determining Apparent Opening Size of a Geotextile
ASTM D 4759	(1988; R 1996) Determining the Specification Conformance of Geosynthetics
ASTM D 4873	(1997) Identification, Storage, and Handling of Geosynthetic Rolls

1.2 SYSTEM DESCRIPTION

Pursuant to the State of Louisiana General Permit for storm water discharges from construction activities, the requirements contained herein shall constitute the Storm Water Pollution Prevention Plan, hereafter called the SWPP Plan for this contract. The Contractor shall implement and diligently pursue all measures required herein. The purpose of the SWPP Plan is to control soil erosion and storm water runoff caused by the construction activities under this contract to the extent necessary to prevent sediment from accumulating in existing drainage ditches, leaving the contract rights-of-way, or entering the Ouachita River or the Tensas River. Requirements under this section of the specifications are supplemental to and shall become part of the overall Environmental Protection Plan required by Section 01354 ENVIRONMENTAL PROTECTION.

1.2.1 Permit Notifications

The Contractor shall notify the permitting agency by submitting a revised Notice of Intent and Notice of Termination as required by the General Permit for storm water discharges for this project as stated below. The Contractor shall maintain copies of all correspondence with the permitting agency with the SWPP Plan for the duration of this contract.

1.2.2 Notice of Intent

A Notice of Intent (NOI) and the SWPPP required by the State of Louisiana will be filed with the permitting agency prior to the award of this contract. The Contractor shall revise the original NOI by identifying the Contractor's name, address, and the individual having the day to day control over the project. The Contractor shall certify and submit the revised NOI to the permitting agency at least 48 hours prior to beginning work. A NOI form is attached at the end of this section. A copy of the original NOI will be provided to the Contractor during the Preconstruction Conference.

1.2.3 Notice of Termination

Upon successful completion of all permanent erosion and sediment controls for this project, and at the direction of the Contracting Officer, the Contractor shall submit a Notice of Termination (NOT) to the permitting agency certifying that all permanent erosion and sediment controls have been completed. A copy of the NOT form is attached at the end of this section.

1.2.4 Permit Notice

The Contractor shall post a notice near the main entrance of the construction site providing: the LPDES permit number for this project or a copy of the NOI if a permit number has not been issued, the name and telephone number of a local contact person, a description of the project, and the location of the SWPP Plan.

1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-13 Certificates

Filter Fabric; FIO.

The Contractor shall submit a certificate of compliance attesting that the filter fabric meets the specified requirements.

1.4 SITE DESCRIPTION

1.4.1 Nature of Construction Activity

The work consists of furnishing all plant, labor, materials and equipment, and constructing the Sicily Island Area Levee Project, Item 1C and 1D in Catahoula Parish, Louisiana. Principal features of the work include clearing and grubbing, excavation, semicompacted and compacted embankment,

turfing, erosion control, sand-clay-gravel or crushed stone surfacing for levees, corrugated metal pipe culverts, storm water pollution prevention, environmental protection, two concrete drainage structures with concrete pressure pipe, engineering fabric, stone protection, sluice gates, lime treated embankment, dewatering, and closure. All units of measure are metric.

1.4.2 Major Activities Which Disturb Soils

The major activities which will disturb the soil at the site include clearing and grubbing, excavation, embankment and grading.

1.4.3 Estimated Areas Affected

The total area of the construction site is approximately 139 hectares. The area of soil that will be disturbed is approximately 113 hectares.

1.4.4 Runoff Coefficient

The estimated runoff coefficient at the site will be 0.55 after construction activities are completed.

1.4.5 Contract Drawings and Specifications

The following features are shown on or can be determined from the contract drawings and specifications:

a. The approximate slopes after the major construction activities.

b. Areas of soil disturbance.

c. The location where stabilization practices are required.

d. Surface waters.

e. Typical best management practices which are anticipated to be used in the control of sediment and erosion control.

1.4.6 Waters Affected

The surface waters which may be affected by this contract are the Ouachita River and the Tensas River. There are no wetlands within the work area.

1.5 CONTROLS

The controls and measures required by the Contractor are described below.

1.5.1 Erosion and Sediment Controls

1.5.1.1 Stabilization Practices

a. General - The stabilization practices required to be implemented shall include permanent seeding (new turf establishment and erosion control), vegetative buffer strips, protection of trees, and preservation of mature vegetation. However, the Contractor may, at his option and at no additional cost to the Government, provide a fall and winter temporary erosion control measure by seeding with rye grass or other approved winter grasses. The Contractor shall maintain a log of the dates when the major grading activities occur, (e.g. clearing and

grubbing, excavation, embankment, and grading); when construction activities permanently cease on a portion of the site; and when stabilization practices are initiated, and shall attach this log to the SWPP Plan. Stabilization practices shall be initiated as soon as practicable in any portion of the site where construction activities have permanently ceased. Where the initiation of stabilization measures after construction activity permanently ceases is precluded by unsuitable conditions caused by the weather, stabilization practices shall be initiated as soon as practicable after conditions become suitable.

b. Interim Stabilization Practices - The interim stabilization practices required are described below.

(1) Only trees that are within the indicated limits to construct the permanent work shall be removed.

(2) Existing vegetative cover shall be preserved to the extent possible to reduce erosion.

c. Permanent Stabilization Practices - The permanent stabilization practices to be implemented are described below.

(1) Permanent seeding (establishment of new turf and erosion control) shall be established as soon as practicable after the embankment and/or final grading is completed.

(2) Mulch shall be placed on areas of permanent turfing treatment as specified.

1.5.1.2 Structural Practices

a. General - Structural practices shall be implemented to divert flows from exposed soils, temporarily store flows, or otherwise control runoff in order to prevent sediments from accumulating in existing drainage ditches, leaving the contract rights-of-way, or from entering the Ouachita River or the Tensas River. The Contractor shall implement the necessary structural practices as may be required to control runoff for his construction methods and procedures. Structural practices shall be implemented in a timely manner during the construction process to minimize erosion and sediment runoff. Structural practices shall be removed after they have served their intended purpose and after their removal has been approved by the Contracting Officer.

b. Devices - Structural practices may include but shall not be limited to the following devices (typical details are shown on the drawings):

(1) Silt fences

(i) General

Filter fabric shall meet the requirements of PART 2 PRODUCTS, paragraph FILTER FABRIC.

Filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range o -17.7 degrees Cf to 48.9 degrees C.

If wooden stakes are utilized for silt fence construction, they shall have a minimum diameter of 50 mm when oak is used and 100 mm when pine is used. Wooden stakes shall have a minimum length of 1.5 meters.

If steel posts (standard "U" or "T" section) are utilized for silt fence construction, they shall have a minimum weight of 2 kg per meter and a minimum length of 1.5 meters.

Wire fence reinforcement for silt fences using standard strength filter fabric shall be a minimum of 14 gauge and shall have a maximum mesh spacing of 152 mm.

(ii) Installation

The height of a silt fence shall be a minimum of 406 mm above the ground surface and shall not exceed 864 mm above the ground surface.

The filter fabric shall be purchased in a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, filter fabric shall be spliced together only at a support post with a minimum 152 mm lap and securely sealed.

A trench shall be excavated approximately 100 mm wide and 100 mm deep on the upslope side of the proposed location of the measure.

When wire support is used, standard-strength filter fabric may be used. Posts for this type of installation shall be placed a maximum of 3 meters apart. The wire mesh fence shall be fastened securely to the upslope side of the posts using heavy duty wire staples at least 25 mm long, tie wires or hog rings. The wire shall extend into the trench a minimum of 50 mm and shall not extend more than864 mm above the ground surface. The standard strength fabric shall be stapled or wired to the wire fence, and 200 mm of the fabric shall be extended into the trench. The fabric shall not be stapled to existing trees.

When wire support is not used, extra-strength filter fabric shall be used. Posts for this type of fabric shall be placed a maximum of 1.8 meters apart. The filter fabric shall be fastened securely to the upslope side of the posts using 25 mm long (minimum) heavy-duty wire staples or tie wires and 200 mm of the fabric shall be extended into the trench. The fabric shall not be stapled to existing trees.

The 100 mm by 100 mm trench shall be backfilled and the soil compacted over the filter fabric.

Silt fences shall be removed upon approval by the Contracting Officer.

(2) Straw Bales.

(i) Installation

Bales shall be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. Bale rows used to retain sediment shall be turned uphill at each end of

each row.

All bales shall be either wire-bound or string-tied. Straw bales shall be installed so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings.

The barrier shall be entrenched and backfilled. A trench shall be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 100 mm. After the bales are staked and chinked (gaps filled by wedging), the excavated soil shall be backfilled against the barrier. Backfill soil shall conform to the ground level on the downhill side and shall be built up to 100 mm against the uphill side of the barrier.

Each bale shall be securely anchored by at least two stakes (minimum dimensions 50 mm x 50 mm x 1 m) or standard "T" or "U" steel posts (minimum weight of 2 kg per meter) driven through the bale. The first stake or steel post in each bale shall be driven toward the previously laid bale to force the bales together. Stakes or steel pickets shall be driven a minimum 0.5 meter deep into the ground to securely anchor the bales.

The gaps between bales shall be chinked (filled by wedging) with straw to prevent water from escaping between the bales. Loose straw may be scattered over the area immediately uphill from a straw bale barrier to increase barrier efficiency.

Straw bale barriers shall be removed upon approval by the Contracting Officer.

(3) Diversion Dikes

(i) Installation

Diversion dikes shall have a maximum channel slope of 2 percent and shall be adequately compacted to prevent failure. The minimum height measured from the top of the dike to the bottom of the channel shall be 0.5 meter. The minimum base width shall be 1.8 metersand the minimum top width shall be 0.6 meters. Diversion dikes shall be located to minimize damages caused by construction operations and traffic.

c. Device Applicability

(1) Straw bales, silt fences, earth dikes, and drainage swales for diversion of runoff upstream from work areas.

(2) Straw bales, silt fences and earth dikes for retention of flow in drains.

(3) Stone outlet protection at drainage structure.

(4) Sediment containment by providing straw bales or silt fences along the toe of fill and cut slopes.

(5) Earth dikes for temporary sediment basins in major drainage channels downstream from work areas.

Structural practices shall be properly placed to effectively retain sediment immediately after completing each phase of work (e.g. clearing and grubbing, excavation, embankment, and grading) in each independent runoff area (e.g. after clearing and grubbing in an area between a ridge and drain). Structural practices shall be placed, and as work progresses, removed/replaced/relocated as needed for work to progress in each runoff area. Structural practices, to the extent necessary to prevent sediment from accumulating in existing drainage ditches, leaving the contract rights-of-way, or from entering the Ouachita River or the Tensas River, shall be implemented as follows:

(1) Along the downhill perimeter edge of disturbed areas.

(2) Along the top of the slope or top bank of drainage ditches, channels, swales, etc. that traverse disturbed areas.

(3) Along the toe of cut slopes and fill slopes of the construction areas.

(4) Perpendicular to the flow in the bottom of existing drainage ditches, channels, swales, etc. that traverse disturbed areas or carry runoff from disturbed areas. Rows of straw bales or silt fences shall be spaced a maximum of 30 meters apart in such existing drains that are within the limits of the work.

(5) Perpendicular to the flow in the bottom of new drainage ditches, channels, and swales. Rows of straw bales or silt fences shall be spaced a maximum of 60 meters apart in drains with slopes equal to or less than 5 percent and 30 meters apart in drains with slopes steeper than 5 percent.

(6) At the entrance to culverts that receive runoff from disturbed areas.

1.5.2 Storm Water Management

1.5.2.1 Management Practices

The storm water management practices that will be permanently installed under this contract are as follows:

a. Establishment of new turf.
b. Erosion control.
c. Stone protection.

1.5.2.2 Methods

a. Establishment of new turf shall be in accordance with Section 02933 NEW TURF ESTABLISHMENT.

b. Erosion control shall be in accordance with Section 02960 EROSION CONTROL.

c. Stone protection shall be in accordance with Section 02380 STONE PROTECTION.

1.5.3 Other Controls

1.5.3.1 Waste Disposal

No solid materials, including building materials, shall be discharged to waters of the United States, except as authorized by a Section 404 permit. Other requirements are included in Section 01354 ENVIRONMENTAL PROTECTION.

1.5.3.2 Off-site Vehicle Tracking

Off-site vehicle tracking of sediments shall be minimized.

1.5.3.3 Compliance with Regulations

The Contractor shall ensure and demonstrate compliance with applicable State or local waste disposal, sanitary sewer or septic system regulations.

PART 2 PRODUCTS

2.1 FILTER FABRIC FOR SILT SCREEN FENCE

The geotextile, as defined by ASTM D 4439, shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistance to deterioration due to ultraviolet and heat exposure. The geotextile shall conform to the physical property requirements in paragraph ACCEPTANCE REQUIREMENTS, subparagraph TESTING.

2.2 ACCEPTANCE REQUIREMENTS

2.2.1 General

All brands of geotextile to be used will be accepted on the following basis.

2.2.2 Mill Certificates or Affidavits

The mill certificate or affidavit shall attest that the filter fabric and factory seams meet chemical, physical, and manufacturing requirements specified. The mill certificate of affidavit shall specify the actual Minimum Average Roll Values and shall identify the fabric supplied by roll identification numbers.

2.2.3 Testing

If requested by the Contracting Officer, Government personnel shall collect filter fabric samples in accordance with ASTM D 4354 for testing to determine compliance with any or all of the requirements specified pursuant to ASTM D 4759 and the following table:

EXTRA STRENGTH FILTER FABRIC FOR SILT SCREEN FENCE

PHYSICAL PROPERTY	TEST PROCEDURE	REQUIREMENTS
Grab Tensile	ASTM D 4632	45.4 kg min.
Elongation (%)		30 % max.
Trapezoid Tear	ASTM D 4533	25 kg min.

EXTRA STRENGTH FILTER FABRIC FOR SILT SCREEN FENCE

PHYSICAL PROPERTY	TEST PROCEDURE	REQUIREMENTS
Mullen Burst	ASTM D 3786	122.5 kg min.
Permittivity	ASTM D 4491	0.2 sec-1 min.
AOS (U.S. Std Sieve)	ASTM D 4751	20-100

NOTE: Standard strength filter fabric for silt screen fence shall meet the same minimum requirements for AOS and Permittivity as the extra strength filter fabric, but may have lower strengths for the remaining properties listed in the table.

2.3 IDENTIFICATION, STORAGE AND HANDLING

Filter fabric shall be identified, stored and handled in accordance with ASTM D 4873.

PART 3 EXECUTION

3.1 MAINTENANCE

The Contractor shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. The following procedures shall be followed to maintain the protective measures identified in the SWPP Plan.

a. Silt Fences

Silt fences shall be inspected in accordance with paragraph INSPECTIONS. Any required repairs shall be made promptly. Close attention shall be paid to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits shall be removed when deposits reach one-third of the height of the barrier or a maximum height of 225 mm. When a silt fence is no longer required, it shall be removed. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall receive erosion control in accordance with Section 02960 EROSION CONTROL.

b. Straw Bales

Straw bale barriers shall be inspected in accordance with paragraph INSPECTIONS. Close attention shall be paid to the repair of damaged bales, end runs and undercutting beneath bales. Necessary repairs to barriers or replacement of bales shall be accomplished promptly. Sediment deposits shall be removed when deposits reach one-half of the height of the barrier. When a straw bale barrier is no longer required, it shall be removed. The immediate area occupied by the bales and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall receive erosion control in

accordance with Section 02960 EROSION CONTROL..

c. Diversion Dikes

Diversion dikes shall be inspected in accordance with paragraph INSPECTIONS. Close attention shall be paid to the repair of damaged diversion dikes and necessary repairs shall be accomplished promptly. When diversion dikes are no longer required, they shall be shaped to an acceptable grade. The areas disturbed by this shaping shall receive erosion control in accordance with Section 02960 EROSION CONTROL.

3.2 INSPECTIONS

3.2.1 General

The Contractor shall inspect disturbed areas of the construction site, areas used for storage of materials that are exposed to precipitation that have not been finally stabilized, stabilization practices, structural practices, other controls, and areas where vehicles exit the site at least once every seven (7) calendar days and within 24 hours of the end of any storm that produces 13 mm or more rainfall at the site. Where sites have been finally stabilized, such inspection shall be conducted at least once every month.

3.2.2 Field Inspections

Disturbed areas and areas used for material storage that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the SWPP Plan shall be observed to ensure that they are operating correctly. Discharge locations or points shall be inspected to ascertain whether storm water pollution prevention measures are effective in preventing significant impacts to receiving waters. Locations where vehicles exit the site shall be inspected for evidence of offsite sediment tracking.

3.2.3 Inspection Reports

For each inspection conducted, the Contractor shall complete a Louisiana Storm Water Pollution Prevention Inspection Report form. The report shall be signed by the Contractor. The report shall be furnished to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT. A copy of the Louisiana Storm Water Pollution Prevention Plan Inspection Report form is included at the end of this section. A log of the inspection dates shall be maintained on the job site and become a part of the SWPP Plan.

3.2.4 Revisions to the Plan

Based on the results of the inspection and immediately after the inspection, the Contractor shall provide to the Contracting Officer any recommended changes to the Storm Water Pollution Prevention Plan. The Contracting Officer will approve or disapprove the proposed changes within seven (7) calendar days after receipt. Changes to the Plan shall be implemented within seven (7) calendar days following approval.

-- End of Section --

STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY

Permits Division
Post Office Box 82135
Baton Rouge, Louisiana 70884-2135
PHONE#: (225) 765-2965 FAX#: (225) 765-0635

LPDES NOTICE OF INTENT (NOI) TO DISCHARGE STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITY

Submission of this Notice of Intent constitutes notice that the party identified in Section I of this form intends to be authorized by an LPDES permit issued for stormwater discharges associated with construction activity in Louisiana. Submission of this Notice of Intent also constitutes that implementation of the Storm Water Pollution Prevention Plan required under the general permit will begin at the time the permittee commences work on the construction project identified in Section II below.

SECTION I
FACILITY OWNER/OPERATOR INFORMATION
(PLEASE TYPE OR PRINT CLEARLY)

Name: _____

Address: _____

City: _____

State: _____ **Zip Code:** _____

Phone: _____

Status of Owner/Operator _____ (F= Federal; S= State; M=Public (other than federal or state); P= private)

SECTION II
SITE INFORMATION

Name of the Project: _____

Location of Project: _____

City: _____ **State:** _____ **Zip Code:** _____

Latitude: _____ Longitude: _____ Parish: _____

Is the facility located on Indian Lands? ____ Yes _____ No

Has the Stormwater Pollution Prevention Plan (PPP) been prepared?__ Yes __ No

Indicate address of location of SWPPP if different from Project Location.

SWPPP Address _____

City: _____ State: _____ Zip Code: _____

Name of Receiving Water: _____

Estimated Construction Start Date: (mo/day/yr) _____

Estimated Completion Date: (mo/day/yr) _____

Estimate of area to be disturbed (to nearest acre): _____

Estimate of Likelihood of Discharge: (choose only one):

___ Unlikely _____ Once per month ____ Once per week ___Once per day ___ Continual

---

Based on the attached list of endangered or threatened species are there any listed in the project area? _____ Yes _____ No

---

List existing or prior Water Discharge Permits for the location _____

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage this system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that signature and submittal of the NOI is deemed to constitute my determination of eligibility under one or more of the requirements of Permit Part I.A.3.e(1), related to the Endangered Species Act requirements. I am also aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name: _____ Date: _____

Signature: _____

Louisiana Storm Water Pollution Prevention Plan
Inspection Report

To be completed every 7 days and within 24 hours of a rainfall event of 0.5 inches or more.

Construction Storm Water General NPDES Permit No. _____
Project: _____
Location: _____

Prime Contractor: _____

Date of Inspection: _____**Date of last rainfall:** _____

Rain Gage Measurement (inches): _____

Inspected By: _____

Vegetative Sediment Erosion Controls Inspected (examples include: surface roughening, temporary seeding, permanent seeding, mulching, sod stabilization, vegetative buffer strips, tree protection, etc.).
_____
_____
_____

Deficiencies Noted: _____
_____
_____
_____

Corrective Action Taken: _____
_____
_____

Structural Practices Inspected (examples include construction entrance/exit, silt fences, brush barriers, drainage swales, check dams, detention/retention basins, sediment traps, temporary sediment basins etc). _____
_____
_____
_____

Deficiencies Noted: _____
_____
_____

Corrective Action Taken: _____
_____
_____

Additional Comments: _____
_____
_____

Inspector's Signature: _____

STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY

Permits Division
Post Office Box 82135
Baton Rouge, Louisiana 70884-2135
PHONE#: (225) 765-2965 FAX#: (225) 765-0635

LPDES NOTICE OF TERMINATION (NOT) OF COVERAGE UNDER LPDES GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY

I. PERMIT INFORMATION

LPDES Stormwater General Permit Number _____

_____ Check here if you are no longer the Operator of the Facility

_____ Check here if the Stormwater discharge is Being Terminated

---

II. FACILITY OPERATOR INFORMATION

1. Name: _____

Address: _____

City: _____

State: _____ Zip Code: _____

Phone: _____

III. FACILITY/SITE LOCATION INFORMATION

Name of Project: _____

Location of Project: _____

City: _____ State: _____ Zip Code: _____

Latitude: _____ Longitude: _____ Parish: _____

IV. CERTIFICATION

I certify under penalty of law that all stormwater discharges associated with industrial activity from the identified facility that are authorized by a LPDES general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this Notice of Termination, I am no longer authorized to discharge stormwater associated with industrial activity under this general permit, and that discharging pollutants in stormwater associated with industrial activity to waters of the State is unlawful under the Clean Water Act where the discharge is not authorized by a LPDES permit. I also understand that the submittal of this Notice of Termination does not release an Operator from liability for any violation of this permit or the Clean Water Act.

Print Name: _____ Date: _____

Signature: _____

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01451

CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.1 REFERENCES

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL
3.2 QUALITY CONTROL PLAN
3.2.1 General
3.2.2 Content of the CQC Plan
3.2.3 Acceptance of Plan
3.2.4 Notification of Changes
3.3 COORDINATION MEETING
3.4 QUALITY CONTROL ORGANIZATION
3.4.1 CQC Organizational Staffing
3.4.1.1 CQC Staff
3.4.1.2 CQC System Manager
3.4.1.3 Supplemental Personnel
3.4.2 Organizational Changes
3.5 SUBMITTALS
3.6 CONTROL
3.6.1 Preparatory Phase
3.6.2 Initial Phase
3.6.3 Follow-up Phase
3.6.4 Additional Preparatory and Initial Phases
3.7 TESTS
3.7.1 Testing Procedure
3.7.2 Testing Laboratories
3.7.2.1 Capability Check
3.7.2.2 Capability Recheck
3.7.3 On-Site Laboratory
3.7.4 Furnishing or Transportation of Samples for Testing
3.8 COMPLETION INSPECTION
3.8.1 Punch List Inspection
3.8.2 Pre-Final Inspection
3.8.3 Final Acceptance Inspection
3.9 DOCUMENTATION
3.10 SAMPLE FORMS
3.11 NOTIFICATION OF NONCOMPLIANCE

-- End of Section Table of Contents --

SECTION 01451

CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3740	(1996) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E 329	(1998) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause INSPECTION OF CONSTRUCTION. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both on-site and off-site, and shall be keyed to the proposed construction sequence.

3.2 QUALITY CONTROL PLAN

3.2.1 General

The Contractor shall furnish for review by the Government, not later than 15 days after receipt of Notice of Award of the contract and at least 7 days prior to the Preconstruction Conference, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause INSPECTION OF CONSTRUCTION. The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.2 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both on-site and off-site, including work by subcontractors, fabricators, suppliers, and purchasing agents:

a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC system manager who shall report to the project manager or someone higher in the Contractor's organization. Project manager in this context shall mean the individual with responsibility for the overall management of the project including quality and production.

b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.

c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters will also be furnished to the Government.

d. Procedures for laying out the work, verifying that the work has been constructed as required, and documenting the results of these quality control activities.

e. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, off-site fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330 SUBMITTAL PROCEDURES.

f. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved.)

g. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

h. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.

i. Reporting procedures, including proposed reporting formats.

j. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks and has separate control requirements. It could be identified by different trades or disciplines, or it could be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section.

This list will be agreed upon during the coordination meeting.

3.2.3 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing a minimum of seven calendar days prior to any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the Contractor's Quality Control Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The Contractor shall contact the Government to mutually schedule the Coordination Meeting at least 48 hours in advance of conducting the meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both on-site and off-site work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

The Contractor shall identify an individual within his organization at the worksite who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. This CQC System Manager shall be on the site at all times during construction and will be employed by the Contractor, except as noted in the following. An alternate for the CQC System Manager will be identified in the plan to serve in the event of the System Manager's absence. Period of absence may not exceed 2 weeks at any one time, and not more than 30 workdays during a calendar year. The requirements for the alternate will be the same as for the designated CQC Manager.

3.4.1 CQC Organizational Staffing

The Contractor shall provide a CQC staff which shall be at the worksite at all times during progress, with complete authority to take any action necessary to ensure compliance with the contract.

3.4.1.1 CQC Staff

Following are the minimum requirements for the CQC staff. These minimum requirements will not necessarily assure an adequate staff to meet the CQC requirements at all times during construction. The actual strength of the CQC staff may vary during any specific work period to cover the needs of the work period. When necessary for a proper CQC organization, the Contractor will add additional staff at no cost to the Government. This listing of minimum staff in no way relieves the Contractor of meeting the basic requirements of quality construction in accordance with contract requirements. All CQC staff members shall be subject to acceptance by the Contracting Officer.

3.4.1.2 CQC System Manager

The CQC System Manager shall be an experienced construction person with a minimum of 5 years experience in related work. The CQC System Manager, and alternate when serving as System Manager, shall perform no other duties in addition to quality control, except that he may also be project superintendent. The CQC System Manager and alternate shall have successfully completed the course, "Construction Quality Management for Contractors". This course is periodically offered at Vicksburg, MS. (The office to contact for this course is CEMVK-CD-MQ at (601) 631-5501.)

3.4.1.3 Supplemental Personnel

A staff shall be maintained under the direction of the CQC System Manager to perform all CQC activities. The staff must be of sufficient size to ensure adequate CQC coverage of all work phases, work shifts, and work crews involved in the construction. These personnel may perform other duties, but must be fully qualified by experience and technical training to perform their assigned CQC responsibilities and must be allowed sufficient time to carry out these responsibilities. The CQC Plan will clearly state the duties and responsibilities of each staff member.

3.4.2 Organizational Changes

The Contractor shall obtain Contracting Officer's acceptance before replacing any member of the CQC staff. Requests shall include the names, qualifications, duties, and responsibilities of each proposed replacement.

3.5 SUBMITTALS

Submittals shall be made as specified in Section 01330 SUBMITTAL PROCEDURES. The Contractor shall be responsible for certifying that all submittals are in compliance with the contract requirements.

3.6 CONTROL

The controls shall include at least three phases of control to be conducted by the CQC System Manager for all definable features of work, as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning each definable feature of work, after all required plans/documents are approved/accepted, and after all copies are at the work site. This phase shall include:

a. A review of each paragraph of applicable specifications.

b. A review of the contract drawings.

c. A check to assure that all materials and equipment have been tested, submitted, and approved.

d. A check to assure that provisions have been made to provide required control inspection and testing.

e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

g. A review of the appropriate activity hazard analysis to assure safety requirements are met.

h. Discussion of procedures for constructing the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that phase of work.

i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

j. The Government shall be notified at least 48 hours in advance of beginning any of the required action of the preparatory phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

a. A check of preliminary work to ensure that it is in compliance with contract requirements. Review minutes of the preparatory meeting.

b. Verification of full contract compliance. Verify required control inspection and testing.

c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with sample panels as appropriate.

d. Resolve all differences.

e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

f. The Government shall be notified at least 48 hours in advance of beginning the initial phase. Separate minutes of this phase shall be

prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

g. The initial phase should be repeated for each new crew to work on-site, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure continuing compliance with contract requirements, including control testing, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon or conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

As determined by the Government, additional preparatory and initial phases may be conducted on the same definable features of work if the quality of on-going work is unacceptable, if there are changes in the applicable CQC staff, on-site production supervision or work crew, if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Testing includes operation and acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instrument calibration data against certified standards.

d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

e. Results of all tests taken, both passing and failing tests, will be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test will be given. If approved, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an off-site or commercial test facility will be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test

facility for this contract.

3.7.2 Testing Laboratories

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of $2,000 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 On-Site Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials will be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Corps of Engineers Division Laboratory, f.o.b., at the following address:

Waterways Experiment Station
3909 Halls Ferry Road
Vicksburg, Mississippi 39180-6199

Coordination for each specific test, exact delivery location, and dates will be made through the Area Office.

3.8 COMPLETION INSPECTION

3.8.1 Punch List Inspection

Near the completion of all work or any increment thereof established by a completion time stated in Section 00800 SPECIAL CONTRACT REQUIREMENTS, paragraph COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK, or stated elsewhere in the specifications, the CQC System Manager shall conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings and specifications. Such a list of deficiencies/uncompleted work shall be included in the CQC documentation, as required by paragraph DOCUMENTATION below, and shall include the estimated date by which the deficiencies/uncompleted work shall be corrected/completed. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies/uncompleted work have been corrected/completed. Once this is accomplished the Contractor shall notify the Government that the facility is ready for the Government "Pre-Final"

inspection.

3.8.2 Pre-Final Inspection

The Government will perform this inspection to verify that the facility is complete and ready to be occupied or put in use. A Government "Pre-Final Punch List" may be developed as a result of this inspection. Any items noted on the "Pre-Final" inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph will be accomplished within the time stated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control System Manager, his Superintendent or other primary personnel, and the Contracting Officer's Representative shall be in attendance at this inspection. The customer and other Government personnel may also be in attendance. In the event of unavailability of the Contractor's representative, the Contracting Officer may elect to conduct the final acceptance inspection as scheduled. The Contracting Officer will formally schedule the final acceptance inspection based upon the results of the pre-final inspection. At least 14 days prior to the scheduled final acceptance inspection, the Contractor shall give the Contracting Officer a written notice of completion. The notice shall include the Contractor's assurance that all items previously identified to the Contractor as being unacceptable and all remaining work under the contract will be completed and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the Contract Clause INSPECTION OF CONSTRUCTION.

3.9 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

a. Contractor/subcontractor and their area of responsibility.

b. Operating plant/equipment with hours worked, idle, or down for repair.

c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

d. Test and control activities performed with results and references to specifications/drawings requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.

e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.

f. Submittals reviewed, with contract reference, by whom, and action taken.

g. Off-site surveillance activities, including actions taken.

h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

i. Instructions given/received and conflicts in plans and/or specifications.

j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 24 hours after the date(s) covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every seven days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10 SAMPLE FORMS

Sample forms enclosed at the end of this section are:

a. CONTRACTOR QUALITY CONTROL (CQC) REPORT FORM

b. PREPARATORY PHASE CHECKLIST FORM

c. INITIAL PHASE CHECKLIST FORM

3.11 NOTIFICATION OF NONCOMPLIANCE

If the Contracting Officer notifies the Contractor in writing of any observed noncompliance with the foregoing requirements, the Contractor shall immediately take all necessary action to corrective the noncompliance. Such notice, when delivered to the Contractor at the worksite, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for additional costs or damages by the Contractor.

-- End of Section --

CONTRACTOR QUALITY CONTROL (CQC) REPORT FORM

CONTRACTOR'S NAME

_____
_____

Daily Report No.:_____ Date: _____
Contract No.:_____

Project Title & Location:_____

Weather:_____ Precipitation:_____[mm][in.] Temp.:_____Min. _____Max.

Percent Suitable for Scheduled Work: _____

1. Contract/Subcontractors and Area of Responsibility:

NUMBER:	TRADE	: HOURS	: EMPLOYER	: LOCATION/DESCRIPTION WORK

2. Operating Plant or Equipment. (Not hand tools)

PLANT/EQUIPMENT	DATE OF ARRIVAL/DEPARTURE	DATE OF SAFETY CHECK	HOURS USED	HOURS IDLE	HOURS REPAIR

CQC REPORT FORM (Cont'd)

3. Work performed today: (Indicate location and description of work performed by prime and subcontractors by letter in table above.)

4. Results of control activities: (Indicate whether P - Preparatory, I - Initial, or F - Follow-up Phase. When a P or I meeting is conducted, complete attachment 1-A or 1-B, respectively. When network analysis system is used, identify work by use of I-J numbers.)

5. Test performed as required by plans and/or specifications:

6. Materials received:

CQC REPORT FORM (Cont'd)

7. Submittals Reviewed:

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

8. Offsite surveillance activities, including action taken:

9. Job safety: (Report violations; Corrective instructions given; Corrective actions taken.)

10. Remarks: (Instructions received or given. Conflict(s) in Plans and/or Specifications.)

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the plans and specifications, to the best of my knowledge, except as noted above.

Authorized CQC System Manager Date

PREPARATORY PHASE CHECKLIST FORM

Contract No.: _____ Date: _____

Definable Feature: _____ Spec Section: _____

Government Rep Notified _____ Hours in Advance Yes ____ No _____

I. Personnel Present:

	NAME	POSITION	COMPANY/GOVERNMENT
1.			
2.			
3.			
4.			
5.			
6.			
7.			

(List additional personnel on reverse side)

II. Submittals

1. Review submittals and submittal log 4288. Have all submittals been approved? Yes _____ No _____

If No, what items have not been submitted?

a. _____
b. _____
c. _____

2. Are all materials on hand? Yes _____ No _____

If No, what items are missing?

a. _____
b. _____
c. _____

3. Check approved submittals against delivered material. (This should be done as material arrives.)

Comments _____
_____

III. Material storage

Are materials stored properly? Yes _____ No _____

If No, what action is taken? _____
_____

PREPARATORY PHASE CHECKLIST FORM (Cont'd)

IV. Specifications

1. Review each paragraph of specifications.

2. Discuss procedure for accomplishing the work.

3. Clarify any differences.

V. Preliminary Work

Ensure preliminary work is correct.

If not, what action is taken? _____

VI. Testing

1. Identify test to be performed, frequency, and by whom. _____

2. When required? _____

3. Where required? _____

4. Review Testing Plan. _____

5. Has test facilities been approved? _____

VII. Safety

1. Review applicable portion of EM 385-1-1. _____

2. Activity Hazard Analysis approved? Yes _____ No _____

VIII. Corps of Engineers comments during meeting.

_____
CQC Representative

INITIAL PHASE CHECKLIST FORM

Contract No.:_____ Date:_____

Definable Feature:_____

Government Rep Notified:_____ Hours in Advance Yes _____ No _____

I. Personnel Present:

	NAME	POSITION	COMPANY/GOVERNMENT
1.			
2.			
3.			
4.			
5.			
6.			

(List additional personnel on reverse side)

II. Identify full compliance with procedures identified at preparatory phase. Coordinate plans, specifications, and submittals.

Comments:_____

III. Preliminary work. Ensure preliminary work is complete and correct. If not, what action is taken?_____

IV. Establish Level of Workmanship.

1. Where is work located?_____

2. Is a sample panel required? Yes ____ No ____

3. Will the initial work be considered as a sample? Yes ____ No ____
(If yes, maintain in present condition as long as possible.)

V. Resolve any Differences.

Comments:_____

INITIAL PHASE CHECKLIST FORM (Cont'd)

VI. Check Safety.

Review job condition using EM 385-1-1 and job hazard analysis.

Comments:_____
_____
_____

_____
CQC Representative

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02111

CLEARING AND GRUBBING

PART 1 GENERAL (Not Applicable)

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS
3.2 CLEARING
3.2.1 General
3.2.2 Merchantable Timber
3.2.3 Trees
3.2.4 Vegetation
3.2.5 Miscellaneous Structure Foundation and Debris
3.2.6 Areas to be Cleared
3.2.6.1 General
3.2.6.2 Borrow Areas
3.2.6.3 Other Areas
3.3 GRUBBING
3.3.1 General
3.3.2 Areas to be Grubbed
3.3.2.1 Levee Embankment and Structures
3.3.2.2 Channels and Ditches
3.3.3 Borrow Areas
3.3.4 Pipes and Drains
3.3.5 Filling of Holes
3.4 DISPOSAL OF DEBRIS
3.4.1 General
3.4.2 Burning
3.4.3 Burying
3.4.4 Removal from Site of Work

-- End of Section Table of Contents --

SECTION 02111

CLEARING AND GRUBBING

PART 1 GENERAL (Not Applicable)

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

All clearing and grubbing work for all required and excavations and levee embankment construction shall be completed at least 150 meters in advance of levee embankment construction. In locations where work on drainage structures is performed prior to embankment construction, all clearing and grubbing shall be completed in advance of the structure and for at least 30 meters on each side of the structure, measured along the levee centerline. If regrowth of vegetation or trees occurs after clearing and grubbing and before beginning required excavation or placement of fill, the Contractor will be required to clear and grub the area again prior to beginning construction, and no payment will be made for this additional clearing and grubbing.

3.2 CLEARING

3.2.1 General

Clearing, unless otherwise specified, shall consist of the complete removal above the ground surface, of all trees, stumps, down timber, snags, brush, vegetation, old piling, loose stone, abandoned structures, abandoned fencing, fencing, drift, pipes and drains, trash, and similar debris.

3.2.2 Merchantable Timber

Merchantable timber remaining within the areas to be cleared on or after the date of award of this contract may be disposed of as the Contractor sees fit, as long as such merchantable timber is either removed from the rights-of-way or is satisfactorily disposed of in accordance with paragraph DISPOSAL OF DEBRIS. The Contractor is precluded from making any claim for time extensions, costs, or damage to his operations by reason of the existence or nonexistence of merchantable timber, crops, debris, or stumps within the areas to be cleared.

3.2.3 Trees

Trees shall be felled in such a manner so as to avoid damage to trees to be left standing, to existing structures and installations, and to those under construction, and with due regard for the safety of employees and others.

3.2.4 Vegetation

Vegetation to be removed shall consist of crops, grass, bushes and weeds. Close-growing grass and other vegetation shall be removed from areas to receive semicompacted or compacted fill to provide a completely bare earth surface immediately prior to foundation preparation. Acceptance of the

vegetation removal operation shall precede the initiation of foundation preparation in the area from which vegetation has been removed.

3.2.5 Miscellaneous Structure Foundation and Debris

The Contractor shall also remove all abandoned foundations, debris, and other materials which remain after buildings or other structures have been removed by others or the Contractor.

3.2.6 Areas to be Cleared

3.2.6.1 General

The entire area to be occupied by the levee embankment, together with strips 2 meters wide contiguous thereto, ramps and road crossings, above ground structures, riprap, channels, and drainage ditches shall be cleared.

3.2.6.2 Borrow Areas

Only those portions of borrow areas from which borrow material will actually be obtained under this contract shall be cleared, and that clearing shall be to the extent necessary to provide materials free from unsuitable matter as described in Section 02230 EMBANKMENT, paragraph UNSUITABLE MATERIALS.

3.2.6.3 Other Areas

Clearing of the area between the 2 m strip contiguous to the levee embankment and adjacent to the borrow area, and traverses left between borrow areas, shall be limited to the minimum required for construction operations.

3.3 GRUBBING

3.3.1 General

Grubbing shall consist of the removal of all stumps, roots, buried logs, old piling, old paving, old foundations, pipes, drains, and other unsuitable matter as described in Section 02230 EMBANKMENT, paragraph UNSUITABLE MATERIALS.

3.3.2 Areas to be Grubbed

3.3.2.1 Levee Embankment and Structures

Grubbing shall be performed within the limits of the levee embankment and all structures together with the 2 m strips contiguous thereto. All roots and other projections over 25 millimeter in diameter shall be removed to a depth of 1 m below the natural surface of the ground or surface of existing embankments and to a depth of 1 m below the subgrade for the foundation of structures. The areas to be grubbed are those specific areas, within the limits specified herein, from which trees, stumps, down timber, snags, old piling, abandoned structures, and other projections have been removed.

3.3.2.2 Channels and Ditches

All stumps and exposed roots and other obstructions shall be removed from within the limits of all channels and ditches to be constructed.

3.3.3 Borrow Areas

Only those portions of borrow areas from which borrow material will actually be obtained under this contract shall be grubbed, and that grubbing shall be to the extent necessary to provide materials free from unsuitable matter as described in Section 02230 EMBANKMENT, paragraph UNSUITABLE MATERIALS.

3.3.4 Pipes and Drains

Pipes and drains shall be removed as indicated on the drawings. The Contractor shall inform the Contracting Officer of all pipes and drains not shown on the drawings which are encountered during grubbing. Such pipe and drains shall not be removed or disturbed until so directed by the Contracting Officer. Material excavated in the process of removing pipes and drains shall be disposed of as specified in Section 02222 EXCAVATION FOR LEVEES, paragraph DISPOSITION OF MATERIALS.

3.3.5 Filling of Holes

All holes caused by grubbing operations and removal of pipes and drains, excluding holes in borrow areas, channels and ditches, shall be backfilled with suitable material in 300 mm layers to the elevation of the adjacent ground surface, and each layer compacted to a density at least equal to that of the adjoining undisturbed material.

3.4 DISPOSAL OF DEBRIS

3.4.1 General

The primary method of disposing of all debris resulting from clearing and grubbing operations shall be burning as specified in paragraph BURNING. The following additional methods will also be permitted: burying in the borrow area as limited by paragraph BURYING, or removal from the site in accordance with paragraph REMOVAL FROM SITE OF WORK. The Contractor shall make a reasonable effort to channel merchantable material into the commercial market to make beneficial use of materials resulting from clearing and grubbing operations.

3.4.2 Burning

In accordance with the Contract Clause PERMITS AND RESPONSIBILITIES, the Contractor shall obtain any permit which may be required for burning. Subject to applicable Federal, State and local laws and burning restrictions, the Contractor may burn material within the contract area at any time within the contract period. The Contractor shall thoroughly burn clearing debris and continue burning until as much debris as practicable is completely reduced to ashes. Burning operations shall be conducted so as to prevent damage to standing timber or other flammable growth. The Contractor shall be responsible for any damage to life and property resulting from fires that are started by his employees or as a result of his operations. The Contractor shall furnish, at the site of burning operations, adequate fire fighting equipment to properly equip his personnel for fighting fires. Fires shall be guarded at all times and shall be under constant surveillance until they have been extinguished.

3.4.3 Burying

Upon approval, the Contractor will be allowed to bury debris that is

unburnable and debris that has been thoroughly burned but cannot be further reduced to ashes. The Contracting Officer will determine which debris is unburnable and which debris cannot be further reduced to ashes. The area available for burial will be adjacent to the riverside limit of excavation within the riverside borrow areas. All material disposed of by burying shall be covered with a minimum of 600 mm of earth.

3.4.4 Removal from Site of Work

The Contractor may elect to remove all or part of the debris from the site of the work. Such disposal shall comply with all applicable Federal, State and local laws. The Contractor shall, at his option, either retain for his own use or dispose of by sale or otherwise, any such materials of value. The Government is not responsible for the protection and safekeeping of any materials retained by the Contractor. Such materials shall be removed from the site of the work before the date of completion of the work. If debris from clearing operations is placed on adjacent property, the Contractor shall obtain, without cost to the Government, additional right-of-way for such purposes in accordance with Section 01000 GENERAL CONTRACT REQUIREMENTS, paragraph RIGHTS-OF-WAY. Such material shall be so placed as not to interfere with roads, drainage or other improvements and in such a manner as to eliminate the possibility of its entering into channels, ditches, or streams. The Contracting Officer reserves the right to approve or disapprove the use of Contractor-furnished disposal areas based on the location of the areas and a determination of the overall impact the proposed disposal areas will have on the environment or the integrity of the levee. Contractor-furnished disposal areas shall not be located in woodlands or wetlands.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02213

ENGINEERING FABRIC

PART 1 GENERAL

1.1 REFERENCES
1.2 SUBMITTALS
1.3 IDENTIFICATION, STORAGE, AND HANDLING

PART 2 PRODUCTS

2.1 MATERIALS
2.1.1 Fabric
2.1.2 Seams
2.1.3 Temporary Securing Pins
2.1.4 Anchor Trench Backfill
2.2 ACCEPTANCE REQUIREMENTS
2.2.1 Mill Certificates or Affidavits
2.2.2 Testing

PART 3 EXECUTION

3.1 INSTALLATION OF ENGINEERING FABRIC
3.1.1 Installation: General

-- End of Section Table of Contents --

SECTION 02213

ENGINEERING FABRIC

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 2487	(1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 4354	(1996) Sampling of Geosynthetics for Testing
ASTM D 4355	(1992) Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
ASTM D 4439	(1998) Geosynthetics
ASTM D 4491	(1996) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(1991; R 1996) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991; R 1996) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(1995) Determining Apparent Opening Size of a Geotextile
ASTM D 4759	(1988; R 1996) Determining the Specification Conformance of Geosynthetics
ASTM D 4833	(1988; R 1996) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D 4873	(1997) Identification, Storage, and Handling of Geosynthetic Rolls
ASTM D 4884	(1996) Strength of Sewn or Thermally Bonded Seams of Geotextiles

1.2 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The

following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-13 Certificates

Mill Certificates or Affidavits; FIO.

The Contractor shall submit in triplicate, a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the engineering fabric. Certificates shall identify the engineering fabric being furnished by roll identification number. Certificates of compliance attesting that the materials meet specification requirements shall be submitted in accordance with Section 01000 GENERAL CONTRACT REQUIREMENTS paragraph CERTIFICATES OF COMPLIANCE.

SD-14 Samples

Fabric; FIO. Seams; FIO.

Samples of engineering fabric shall be submitted for testing 60 days prior to the beginning of installation of the engineering fabric. Actual field sewn seam samples shall be submitted for testing 60 days prior to the beginning of installation of the engineering fabric. The sample average test results (weaker principle direction for mechanical tests) for a particular property for any individual roll tested within a lot shall meet or exceed the minimum average roll value (MARV) indicated in the manufacturer's certification.

1.3 IDENTIFICATION, STORAGE, AND HANDLING

The geotextile shall be identified, stored, and handled in accordance with ASTM D 4873.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Fabric

The engineering fabric shall be a nonwoven geotextile, as defined by ASTM D 4439, consisting of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, ethylene, or amide, and shall contain stabilizers and/or inhibitors added to the base plastic if necessary to make the filaments resistant to deterioration due to ultraviolet and heat exposure. The nonwoven engineering fabric shall conform to the physical property requirements tests in TABLE NO. 1 - PHYSICAL STRENGTH REQUIREMENTS, paragraph ACCEPTANCE REQUIREMENTS. The fabric rolls (strips) shall be manufactured in a minimum width of 3.5 m.

2.1.2 Seams

The seams of the engineering fabric shall be sewn with thread of a material meeting the chemical requirements given above for the engineering fabric. Seams shall be tested in accordance with method ASTM D 4884. The strengths of the seam shall be not less than 80 percent of the required tensile strength (TABLE NO. 1 - PHYSICAL STRENGTH REQUIREMENTS) of the unaged fabric in any principal direction. Fabric and seams shall be aligned as

specified in paragraph INSTALLATION OF ENGINEERING FABRIC.

2.1.3 Temporary Securing Pins

Temporary securing pins shall not be used.

2.1.4 Anchor Trench Backfill

Anchor trench backfill shall be filter material, bedding material or pervious material such as sands or gravels (SP, SW, GW, or GP) classified in accordance with ASTM D 2487.

2.2 ACCEPTANCE REQUIREMENTS

All brands of engineering fabric and all seams, except field sewn seams, will be accepted on the following basis.

2.2.1 Mill Certificates or Affidavits

The mill certificates or affidavits shall attest that the fabric and factory seams meet chemical, physical, and manufacturing requirements stated in this specification. The mill certificates or affidavits shall specify the actual Minimum Average Roll Values (MARV) and shall identify the fabric supplied by manufacturer's name and roll identification numbers.

2.2.2 Testing

If requested, government personnel shall collect engineering fabric samples in accordance with ASTM D 4354 for testing to determine compliance with any or all of the requirements in this specification pursuant to ASTM D 4759 and the following table:

TABLE NO. 1 - PHYSICAL STRENGTH REQUIREMENTS

Minimum Average Roll Values (MARV)

PHYSICAL PROPERTY	GRADE 2	TEST PROCEDURE
Tensile Strength +(unaged fabric)	1.07 kN Minimum	ASTM D 4632
Elongation	25 percent Minimum	ASTM D 4632
Puncture Strength +(unaged fabric)	0.51 kN Minimum	ASTM D 4833
Trapezoid Tear	0.40 kN Minimum	ASTM D 4533
Permittivity	Greater than 0.7 per sec.	ASTM D 4491
Apparent Opening Size	Less than 70 sieve (less than 0.212mm)	ASTM D 4751
Ultraviolet Resistance	70 percent Minimum (percent of strength retained after 500 hours)	ASTM D 4355

+ Unaged fabric is defined as fabric in the condition received from the manufacturer or distributor.

PART 3 EXECUTION

3.1 INSTALLATION OF ENGINEERING FABRIC

3.1.1 Installation: General

The engineering fabric shall be placed in the manner and at the locations shown. At the time of installation, fabric shall be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation or storage. The surface to receive engineering fabric shall be relatively smooth and free of obstructions, depressions, debris, and soft or low density pockets of material. The fabric shall be placed with the long dimension (machine direction) of the engineering fabric parallel to the centerline of the channel and shall be laid smooth and free of tension, stress, folds, wrinkles, or creases. The panels (sheets or strips) shall be placed to provide a minimum overlap width of 600 mm after placement of the riprap for each joint with the upstream panel overlapping the downstream panel and with the panels placed on channel slopes with the upper panel overlapping the next lower panel. Weights (Riprap) shall be used to temporarily hold the fabric in such a manner as to prevent the wind or other disturbance from lifting the fabric or shifting the overlap. The perimeter of the engineering fabric shall be anchored into the foundation with a trench or attached to the structure. The trench at the top of the slope shall not be backfilled until the filter material and riprap is in place on the fabric. Anchor trench backfill shall be used to anchor the engineering fabric in the trench. The fabric shall be protected at all times during construction from contamination by surface runoff and fabric so contaminated shall be removed and replaced with uncontaminated fabric at no cost to the Government. Wheeled and/or tracked vehicles used in the placement of filter material or riprap are not allowed directly onto fabric and shall be of such design that they will not damage the underlying engineering fabric. Any fabric damaged during its installation or during placement of filter material or riprap shall be replaced by the Contractor at no cost to the Government. The work shall be scheduled so that the covering of the fabric with a layer of the specified material is accomplished within 10 days after placement of the fabric. Failure to comply shall require replacement of the engineering fabric at no additional cost to the Government. The engineering fabric shall be protected from damage due to the placement of riprap or other materials by limiting the height of drop of the material to 1 m. Before placement of riprap, the Contractor shall demonstrate that the placement technique will prevent damage to the fabric.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02222

EXCAVATION FOR LEVEES

PART 1 GENERAL

1.1 MEASUREMENT AND PAYMENT
1.1.1 Measurement
1.1.1.1 Excavation
1.1.1.2 Waste Materials

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 HAUL ROADS
3.2 EXCAVATION IN BORROW AREAS
3.2.1 General
3.2.1.1 Equipment
3.2.2 Borrow Areas
3.2.2.1 Requirements
3.2.3 Disposition of Materials
3.2.3.1 Suitable Materials
3.2.3.2 Unsuitable Materials
3.3 EXCAVATION IN OTHER AREAS
3.3.1 General
3.3.2 Drainage Ditches
3.3.2.1 Excavation
3.3.3 Acceptance

-- End of Section Table of Contents --

SECTION 02222

EXCAVATION FOR LEVEES

PART 1 GENERAL

1.1 MEASUREMENT AND PAYMENT

1.1.1 Measurement

1.1.1.1 Excavation

Excavation required by this section will not be measured for payment, except for materials ordered wasted by the Contracting Officer.

1.1.1.2 Waste Materials

Materials ordered wasted by the Contracting Officer will be measured for payment by the cubic meter. The basis of measurement will be a survey of the area taken by the Government prior to the excavation and a second survey of the same area taken by the Government after completion of the excavation.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 HAUL ROADS

Haul roads between borrow areas and fill areas shall meet the minimum requirements specified herein. At no additional cost to the Government, the Contractor shall increase the minimum specified requirements as necessary, due to job site conditions, to assure safe operations. Whenever practical, one-way haul roads shall be used. Haul roads used for this work shall comply with the following:

(a) One-way haul roads for off-the-road haulage equipment; (e.g., belly dumps, scrapers, and off-the-road trucks) shall have a minimum usable width of 7.6 m. One-way haul roads for over-the-road haulage equipment (e.g., dump trucks, etc.) shall have a minimum usable width of 4.6 m.

When it is impractical to obtain the specified minimum widths for one-way haul roads (e.g., a road on top of a levee), a usable width of not less than 3 m may be approved, provided a positive means of traffic control is implemented. Such positive means shall include signs, signals, or signalmen and an effective means of speed control.

(b) Two-way haul roads for off-the-road haulage equipment shall have a minimum usable width of 18.3 m. Two-way haul roads for over-the-road haulage equipment shall have a minimum usable width of 9.1 m.

(c) Haul roads shall be maintained to keep the surface free from potholes, ruts and similar conditions that could result in unsafe conditions. Haul roads shall be maintained free of all construction related debris, including loose riprap.

(d) Curves and changes in grade shall allow a minimum sight distance of 61 m for one-way haul roads and 91.5 m for two-way haul roads. Sight distance is defined as the centerline distance an equipment operator (1372 mm above the road surface) can see an object 1372 mm above the road surface. When conditions make it impractical to obtain the required minimum sight distances (e.g., ramps over levees), a positive means of traffic control shall be implemented.

(e) Dust abatement shall permit observation of objects on the roadway at a minimum distance of 91.5 m.

(f) Haul roads shall have the edges of the usable portion marked with posts at intervals not greater than 15.2 m on curves and not greater than 61 m elsewhere. Such markers shall extend 1829 mm above the road surface, and for nighttime haulage shall be provided with reflectors in both directions.

3.2 EXCAVATION IN BORROW AREAS

3.2.1 General

The rights-of-way and earth materials for constructing the work will be furnished without cost to the Contractor, at locations specified herein and shown on the drawings. If any abandoned oil well locations are disturbed during excavation, the Contractor shall reclose the well following local and state laws at no additional cost to the Government.

3.2.1.1 Equipment

The Contractor shall provide the types of equipment as necessary to perform the required excavation according to the in situ conditions of the borrow area.

3.2.2 Borrow Areas

3.2.2.1 Requirements

Borrow areas shall conform to requirements prescribed herein and as shown on the drawings. Material for the embankment shall be obtained from the borrow areas shown on the drawings. The permissible excavation depths in the borrow areas are indicated on the drawings. Excavation to the permissible depths may require excavation below the ground water table. The bottom of the areas excavated under this contract shall be dressed to the extent necessary to provide a reasonably smooth surface that can readily be traversed by a 50 to 60 horsepower farm tractor pulling a rotary-type pasture mower and sloped to provide surface drainage to the low side of the borrow area as soon as all usable materials have been removed or the Contractor has completed his use of the borrow area. Abrupt changes in grade shall be avoided. Unsuitable material wasted in the borrow areas shall be sloped to drain. Any excavation below the depths and sloped specified herein, or shown on the drawings, shall be backfilled by the Contractor, at his expense, to the specified permissible excavation line, with suitable material placed and compacted in accordance with Section 02230 EMBANKMENT, paragraph SEMICOMPACTED FILL. The borrow areas excavated under this contract shall be drained and kept dry during excavation, as excavation will not be permitted in water nor shall excavated material be scraped, dragged or otherwise moved through water. Drainage of borrow areas shall be accomplished by ditching, sump pumping or other approved

methods. The borrow areas excavated under this contract and inundated from high river stages shall be drained of water regardless of its source, including subsurface water, and allowed to dry to a workable condition as quickly as practicable after the high river stage has passed. The Contractor, at his option, may use rights-of-way for drainage other than those furnished by the Government provided that their location and dimensions are approved by the Contracting Officer, and provided that the Contractor has obtained the rights-of-way in accordance with Section 01000 GENERAL CONTRACT REQUIREMENTS, paragraph RIGHTS-OF-WAY. Except as required by variable right-of-way widths, abrupt changes in borrow area alignment shall be avoided. To conserve arable land and make optimum use of available borrow, the excavation of the borrow areas, shall be made continuous throughout the length of the borrow areas to the permissible borrow depths, and at the width necessary to provide the required quantity of suitable material, and in such manner that all suitable available material within the required width between the leveeward limits of the borrow areas and the back of the borrow areas will be utilized. The Contractor shall submit an excavation plan for approval by the Contracting Officer and shall not begin excavation until the Contracting Officer's approval has been received. The plan shall contain, as a minimum, the following:

a. The Contractor's proposals for implementing Section 01354 ENVIRONMENTAL PROTECTION insofar as that section applies to borrow areas.

b. The Contractor's proposed methods for draining and keeping the borrow areas free of water during excavation under this contract.

c. The Contractor's proposed methods for draining borrow areas excavated under this contract which may be inundated by high river stages.

d. A statement indicating whether the Contractor proposes to use:

(1) Government-furnished rights-of-way for drainage;

(2) Contractor-furnished rights-of-way for drainage; or

(3) A combination of Government-furnished and Contractor-furnished rights-of-way for drainage.

e. For Contractor-furnished rights-of-way for drainage, the plan shall contain all of the information required by paragraph REQUIREMENTS and the Contractor's proposals for implementing Section 01354 ENVIRONMENTAL PROTECTION, insofar as that section applies to rights-of-way for drainage.

f. The Contractor's proposals for conserving arable land and for making optimum use of available borrow, including the Contractor's proposed methods for smoothing the bottom of the borrow areas after having completed use of the borrow areas.

3.2.3 Disposition of Materials

3.2.3.1 Suitable Materials

Excavated materials which are suitable for incorporation in the levee embankment, or other fills or backfill, shall either be placed directly

therein, or stockpiled and subsequently used in the levee embankment or other fills or backfill.

3.2.3.2 Unsuitable Materials

Materials from required excavation which, as defined in Section 02230 EMBANKMENT, paragraph UNSUITABLE MATERIALS, are unsuitable for levee embankment or fill or backfill material will be ordered wasted and shall be disposed of in abandoned portions of borrow areas. The material shall be shaped so that its surface is free from abrupt changes in grade and shall be sloped to drain. Where possible, unsuitable materials in borrow areas shall not be removed.

3.3 EXCAVATION IN OTHER AREAS

3.3.1 General

Excavation from other areas shall consist of removal of material in preparing the levee embankment foundations to the lines and grades shown on the drawings, removal of materials from ditches and channels, removal of material from structural excavation areas as specified in Section 02226 EXCAVATION, FILL, AND BACKFILL FOR STRUCTURES, and removal of unsuitable materials as defined in Section 02230 EMBANKMENT, paragraph UNSUITABLE MATERIALS. Whenever unsuitable foundation material is encountered, the unsuitable material shall be removed to the depth directed by the Contracting Officer. Care shall be exercised by the Contractor in excavating to the lines and grades shown and in removing unsuitable materials so as not to excavate below the grades specified or depth directed. Excavation below the lines and grades specified or the depth directed shall be backfilled by the Contractor at his expense. Such backfill shall be brought to grade with suitable material with each layer placed and compacted as specified in Section 02230 EMBANKMENT, paragraph SEMICOMPACTED FILL. Excavated materials shall be disposed of as specified in paragraph DISPOSITION OF MATERIALS.

3.3.2 Drainage Ditches

3.3.2.1 Excavation

Drainage ditches shall be excavated to the cross sections, lines, and grades shown on the drawings. Suitable material excavated from these ditches shall be used in the required embankment. Any excess material or material unsuitable for use in the embankment shall be wasted and shall be disposed of as specified in paragraph UNSUITABLE MATERIALS. The right is reserved to require such other ditching as is deemed desirable and which can be performed without unreasonable difficulty by the equipment on the job. Suitable material excavated from such ditching may, at the option of the Contractor, be used in the embankment. Material not so used shall be wasted and shall be disposed of as stated above.

3.3.3 Acceptance

Prior to the acceptance of the work, the Contractor shall excavate sediments from channels and ditches as necessary to restore them to grade and section. Disposal of such material shall be as directed, and no additional payment will be made for this work.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02226

EXCAVATION, FILL, AND BACKFILL FOR STRUCTURES

PART 1 GENERAL

1.1 REFERENCES

PART 2 PRODUCTS

2.1 MATERIALS
2.1.1 General
2.1.2 Pervious Backfill
2.1.3 Structure Backfill and Semicompacted Fill
2.1.4 Clay Blanket
2.1.5 Frozen Materials
2.1.6 Unsuitable Materials

PART 3 EXECUTION

3.1 EXCAVATION
3.1.1 General
3.1.2 Excavation for Structure and Ditches
3.1.3 Removal of Unsuitable Materials
3.1.4 Disposal of Excavated Materials
3.1.4.1 Disposal of Discarded Materials
3.2 Stockpiling of Materials
3.3 PLACEMENT
3.3.1 Backfill, Fill, and Clay Blanket
3.3.1.1 General
3.3.1.2 Spreading
3.4 COMPACTION
3.4.1 Semicompacted Fill
3.4.2 Fully Compacted Fill and Backfill
3.4.2.1 Structure Backfill and Clay Blanket
3.4.2.2 Pervious Backfill
3.4.3 Filter Materials
3.4.4 Additional Compaction
3.5 MOISTURE CONTROL
3.5.1 General
3.5.2 Structure Backfill and Clay Blanket
3.5.3 Pervious Backfill
3.6 SLIDES
3.6.1 Embankment Slides
3.6.2 Ditch Slides
3.7 GRADE TOLERANCES
3.7.1 General
3.7.2 Ditches
3.7.3 Structure Excavation
3.8 FIELD TESTING CONTROL

SECTION 02226

EXCAVATION, FILL, AND BACKFILL FOR STRUCTURES

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 698	(1991; R 1998) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))
ASTM D 2216	(1998) Laboratory Determination of Water (Moisture) Content of Soil and Rock
ASTM D 2487	(1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1996) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 General

All materials for backfill and fill shall be free of roots, trash and other objectionable matter and shall be obtained from the required excavations, from the designated borrow areas, or from approved offsite borrow areas or sources at no additional cost to the Government. No frozen material shall be placed and material shall not be placed against frozen surfaces.

2.1.2 Pervious Backfill

Pervious backfill shall be washed sand composed of tough, durable particles and shall contain no organic matter nor soft, friable particles. The pervious backfill material shall be clean, free draining sand (SP and SW classified in accordance with ASTM D 2487) except that no more than 5 percent by weight shall pass a No. 200 sieve.

2.1.3 Structure Backfill and Semicompacted Fill

Except as specified below, structure backfill and semicompacted fill material shall consist of any or all types of materials (except organic

materials) from required excavation or from borrow. Material classified in accordance with ASTM D 2487 as gravels (GW, GP, GM) and sands (SW, SP, SM) shall not be used unless suitably blended with less pervious material. The addition of less pervious material and the blending shall be accomplished to such a degree that the material is changed to a classification other than gravels (GW, GP, GM) and sands (SW, SP, SM) such as clayey gravel (GC) or clayey sand (SC).

2.1.4 Clay Blanket

Clay blanket material shall be classified as clay (CL) or (CH) in accordance with ASTM D 2487.

2.1.5 Frozen Materials

Under no circumstances shall frozen earth, snow or ice be placed in fill or backfill. The Contractor may waste frozen material, at his own expense, in order to proceed with the work.

2.1.6 Unsuitable Materials

Unsuitable materials for fill or backfill material shall be as defined in accordance with Section 02230 EMBANKMENT, paragraph UNSUITABLE MATERIALS.

PART 3 EXECUTION

3.1 EXCAVATION

3.1.1 General

Excavation shall consist of removal and disposal of all materials of whatever nature encountered that may be necessary to excavate for structural foundations, pipe trench, and ditches. Excavation may be performed by any approved methods which will produce the desired results. Excavation shall be performed to the lines, grades, and sections indicated on the drawings.

3.1.2 Excavation for Structure and Ditches

The foundations for the structures shall be excavated to the lines and grades necessary for placement of formwork and concrete and that will insure stable slope conditions throughout the construction. The ditches shall be excavated to the lines, grades and sections indicated on the drawings, within allowable tolerance. All foundations shall be on solid, undisturbed or properly compacted material. The bottom and side slopes of excavation upon or against which concrete or filters are to be placed shall be accurately finished to the dimensions prescribed and/or directed, within allowable tolerance. Where disturbed by the Contractor's operations and elsewhere as required, the excavated surfaces shall be moistened with water or dried as necessary and tamped or rolled with suitable tools or equipment for the purpose of thoroughly compacting them and forming firm foundations upon or against which to place the concrete or stone. Except for the permissible tolerance, overexcavation will not be permitted except to remove unsuitable material as directed by the Contracting Officer. If at any point in the excavation, unauthorized excavation is made beyond the excavation lines shown on the drawings, such unauthorized overexcavation shall be backfilled with approved materials, placed in layers not more than 100 mm in thickness, and thoroughly compacted by tamping or rolling to a density at least equal to that of the adjacent similar undisturbed

material, at no additional cost to the Government. Allowable tolerances shall be as specified in paragraph GRADE TOLERANCES.

3.1.3 Removal of Unsuitable Materials

If, at any point in the excavation for the structure, the foundation material below the lines indicated on the drawings is found to be unsuitable, it shall be removed to the depth directed by the Contracting Officer and replaced with approved material placed and compacted as specified above for backfill of overexcavation. Payment for authorized overexcavation and backfill of authorized overexcavation will be made in accordance with the Contract Clause CHANGES.

3.1.4 Disposal of Excavated Materials

Suitable materials removed from required excavation may be disposed of by placing directly into embankment fill, backfill, or by stockpiling for later use in embankment fill or backfill. Materials from structure which are not suitable for use as embankment fill or backfill, or in excess of that required for embankment fill or backfill, shall be disposed of in accordance with Section 02222 EXCAVATION FOR LEVEES, paragraph UNSUITABLE MATERIALS.

3.1.4.1 Disposal of Discarded Materials

Discarded material other than those which can be included in the solid waste category shall be disposed of as specified in paragraph EXCAVATION, subparagraph DISPOSAL OF EXCAVATED MATERIALS.

3.2 Stockpiling of Materials

Stockpiles of materials temporarily stored for later use shall be located in areas approved by the Contracting Officer. Stockpiles shall be built up in layers not more than 600 mm in thickness. Stockpiled material shall have a maximum height not to exceed 3 m, shall have end and/or side slopes not steeper than 1V on 2H, and the surfaces of all stockpiles shall be sloped to drain readily and sealed by compacting. Excavation from stockpiles shall be made so as to maintain drainage at all times. No stockpiled material shall be placed within 6 m of top bank of inlet or outlet ditches as finally excavated. No material shall be stockpiled within 6 m of top bank of structure excavation.

3.3 PLACEMENT

3.3.1 Backfill, Fill, and Clay Blanket

3.3.1.1 General

All fills, backfills, and clay blanket associated with the concrete structure to the lines and grade shown on the drawings shall be placed as fully compacted fill. Fills and backfills associated with the ditches riser pipes shall be placed as semicompacted fill. No backfill or fill shall be placed on any part of the foundation until such areas have been inspected and approved. Backfill or fill shall not be placed on or against concrete surfaces prior to 14 days after the placing of the concrete, except when otherwise approved or required by the Contracting Officer. The foundation surface and any concrete surfaces shall be suitably moistened prior to placement of backfill against them. Unless otherwise directed, the backfill or fill shall be brought up and maintained at approximately

the same level regardless of the number of types of material being placed. Materials shall be so placed that there is no mixing of the different types of materials in the backfill or fill. No backfill or fill shall be placed on frozen surfaces and no frozen materials shall be placed in the backfill or fill.

3.3.1.2 Spreading

After dumping, the materials shall be spread by bulldozer or other approved means in approximately horizontal layers over the entire area under construction. During the dumping and spreading process, the Contractor shall remove all roots, trash and debris from the backfill materials. Semicompacted materials shall be placed in layers, the first layer not more than 150 mm in thickness and the succeeding layers not more than 300 mm thick prior to compaction with tamping rollers. Thickness of layers of pervious material shall not be greater than 200 mm. Structure backfill and clay blanket shall be placed in layers not more than 150 mm in thickness prior to compaction. As soon as practicable after commencement of construction of any section of the backfill or fill, the surface shall be sloped to drain freely and shall be so maintained throughout construction. If the compacted surface of any layer of material is determined to be too smooth to bond properly with the succeeding layers, it shall be loosened by harrowing or by other approved means before the succeeding layer is placed thereon. Ruts in the surface of any layer shall be removed by scarifying before placing and compacting additional materials.

3.4 COMPACTION

3.4.1 Semicompacted Fill

Semicompacted fill and backfill shall be compacted in accordance with Section 02230 EMBANKMENT, paragraph SEMICOMPACTED FILL.

3.4.2 Fully Compacted Fill and Backfill

3.4.2.1 Structure Backfill and Clay Blanket

After a layer of structure backfill and clay blanket has been dumped and spread, it shall be harrowed or disked, if required, to break up and blend the backfill materials, unless harrowing or disking is performed to obtain uniform moisture distribution. Harrowing or disking shall be performed with a spring-tooth harrow or other approved harrow or disk to the depth of the uncompacted layer. If one pass of the harrow or disk does not accomplish the breaking up and blending of the materials, additional passes of the harrow or disk may be required, but in no case will more than three passes of the harrow or disk on any one layer be required for this purpose. When the moisture content and the condition of the layer is satisfactory, the lift shall be compacted to at least 95 percent of the maximum density as determined by the Contractor in accordance with ASTM D 698. Portions of the backfill or fill which are not accessible to the roller and portions within 600 mm of concrete shall be placed in 100 mm layers and compacted with power tampers to a degree equal to that obtained on the other portions of the compacted backfill or fill by rolling as specified. Dumping, spreading, sprinkling, and compacting may be performed at the same time as different points along a section when there is sufficient area to permit these operations to proceed simultaneously.

3.4.2.2 Pervious Backfill

Immediately after each layer of pervious backfill or fill material has been dumped, spread and saturated, the entire surface of the layer shall be compacted by not less than four complete passes of the crawler-type tractor. Crawler-type tractors used for spreading or compaction shall weigh not less than 9,070 kg, shall exert a unit tread pressure of not less than 41.4 kPa, and shall be operated at speeds not to exceed 5.6 kilometers per hour when being used for compaction. The tractor will not be considered to be compacting while spreading material. A complete pass shall consist of one entire coverage of the layer by the threads of the tractor or the surface of the roller. Pervious backfill placed within 600 mm of concrete shall be placed in layers not more than 200 mm thick, shall be saturated by flooding and shall be compacted by use of approved small vibratory compactors to the density at least equal to that of the surrounding embankment.

3.4.3 Filter Materials

Filter materials, sand and gravel shall be compacted as specified in paragraph COMPACTION, subparagraph FULLY COMPACTED FILL AND BACKFILL, subparagraph PERVIOUS BACKFILL.

3.4.4 Additional Compaction

If the desired compaction of any portion of the backfill, fill or embankment is not secured by the minimum number of passes specified, additional complete passes may be directed over the surface area of such designated portion until the desired compaction, as defined by the Contracting Officer, has been obtained, and an equitable adjustment in the contract price and time will be made in accordance with the Contract Clause CHANGES.

3.5 MOISTURE CONTROL

3.5.1 General

The materials in each layer of the backfill or fill shall contain the quantity of moisture within the limits specified below or as directed which is necessary to obtain the desired compaction as determined by the Contracting Officer.

3.5.2 Structure Backfill and Clay Blanket

The moisture content shall be as uniform as practicable throughout any one layer of structure backfill and clay blanket. The upper and lower limits of moisture content shall not be more than 3 nor less than 2 percentage points, respectively, from the optimum moisture content as determined by the Contractor in accordance with ASTM D 698. The method of determining the moisture content shall be according to ASTM D 2216 or ASTM D 3017. Material that is too wet shall be spread on the backfill and permitted to dry, assisted by disking or harrowing, if necessary, until the moisture content is reduced to a value within the specified limits. When the material is too dry, the Contractor will be required to sprinkle each layer on the backfill. Harrowing or other approved methods will be required to work the moisture into the material until a uniform distribution of moisture is obtained. Water applied on a layer of backfill shall be accurately controlled in quantity so that free water will not appear on the surface during or subsequent to rolling. Should too much water be added to any part of the backfill so that the material is too wet to obtain the desired compaction, the rolling and all work on that section of the

backfill shall be delayed until the moisture content of the material is reduced to a value within the specified limits and such delay shall not be the basis for a claim. If it is impracticable to obtain the specified moisture content by wetting or drying the material on the backfill, the Contractor may be required to prewet or dry back the material at the source. If, in the opinion of the Contracting Officer, the top or contact surfaces of a partial backfill section becomes too dry or too wet to permit suitable bond between these surfaces and the additional backfill to be placed thereon, the Contractor shall loosen the dried or wet materials by scarifying or disking to such depths as may be directed by the Contracting Officer, shall dampen or dry the loosened material to an acceptable moisture content and shall compact this layer as provided in paragraph COMPACTION, to densities comparable to the underlying backfill or fill, at no additional cost to the Government.

3.5.3 Pervious Backfill

Pervious backfill shall be wetted by sprinkling after spreading for compaction and each layer shall be kept in a saturated condition during rolling. Sprinkling shall be done by approved methods. All connections in the water supply system shall be watertight. Jets shall not be directed at the backfill with such force that finer materials will be washed out. Pervious backfill materials shall be kept free of muddy water and surface runoff and any pervious backfill material which becomes contaminated shall be removed and replaced at no expense to the Government.

3.6 SLIDES

3.6.1 Embankment Slides

In the event of the sliding of any part of the embankment during construction or after completion, but prior to acceptance, the Contractor shall, upon written order of the Contracting Officer, cut out and remove the slide and then rebuild that portion of the embankment or as an alternative shall construct a stability berm of such dimensions and placed in such manner as the Contracting Officer shall prescribe. In case the slide is caused through fault or negligence of the Contractor, the foregoing operations shall be performed without cost to the Government. In case the slide in the embankment is not caused through fault or negligence of the Contractor, the volume ordered removed from the embankment and volume replaced in the embankment will be paid for in accordance with the Contract Clause CHANGES, in addition to any payment due the Contractor for materials previously placed. In either case, the method of slide correction will be determined by the Contracting Officer.

3.6.2 Ditch Slides

In case sliding occurs in any part of the prescribed excavation for the inlet or outlet ditch during construction or after completion but prior to acceptance, the Contractor shall remove and repair such portions of the slides as the Contracting Officer may direct. In case the slide is caused through fault or negligence of the Contractor, the slide shall be removed and repaired without cost to the Government. In case the slide is not caused through fault or negligence of the Contractor, an equitable adjustment pursuant to the Contract Clause CHANGES will be made for removing and repairing the slide.

3.7 GRADE TOLERANCES

3.7.1 General

Embankments and fills shall be constructed to the lines and grades and sections indicated on the contract drawings. The following tolerances will be permitted above and below the design grades and cross sections provided that the areas drain and there are no abrupt bulges or depressions in surfaces and side slopes are uniform.

3.7.2 Ditches

For the bottom elevation and side slopes of the ditches, a vertical tolerance of plus or minus 150 mm from the grade indicated on the drawings will be permitted and shall present a neat, smooth surface, and shall be free from all obstructions.

3.7.3 Structure Excavation

For the bottom and side slopes of structure excavation upon or against which concrete or filters are to be placed, a vertical tolerance of plus 13 mm and minus 50 mm for concrete and plus 50 mm and minus 100 mm for stone protection areas will be permitted.

3.8 FIELD TESTING CONTROL

Testing shall be the responsibility of the Contractor and shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval. Field density and moisture content tests shall be performed on every 200 cubic meters of structure backfill and clay blanket material placed. Field in-place density and moisture shall be determined in accordance with ASTM D 2922 and ASTM D 3017, respectively. The calibration checks of both the density and moisture gages shall be made at the beginning of a job on each different type of material encountered and at intervals as directed. The Contractor shall submit daily records of control tests and reports as well as records of corrective action in accordance with Section 01451 CONTRACTOR QUALITY CONTROL.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02230

EMBANKMENT

PART 1 GENERAL

1.1 REFERENCES

PART 2 PRODUCTS

2.1 EMBANKMENT MATERIALS
2.1.1 General
2.1.2 Graded Stone "C"
2.1.3 Unsuitable Materials
2.1.4 Frozen Materials

PART 3 EXECUTION

3.1 FOUNDATION PREPARATION
3.1.1 General
3.1.2 Drainage
3.1.3 Frozen Ground
3.2 LEVEE EMBANKMENT CONSTRUCTION
3.2.1 Semicompacted Fill
3.2.1.1 General
3.2.1.2 Moisture Control for Semicompacted Fill
3.2.1.3 Compaction for Semicompacted Fill
3.3 Closure Embankment Construction
3.3.1 General
3.3.2 Uncompacted Fill
3.3.3 Compacted Fill
3.3.3.1 General
3.3.3.2 Moisture Control for Compacted Fill
3.3.3.3 Compaction for Compacted Fill
3.4 DRESSING
3.5 CROSS SECTIONS AND ZONING OF MATERIALS
3.5.1 Levee Embankment Sections
3.5.2 Zoning of Materials for Levee Construction
3.6 ROADS, RAMPS, AND CROSSINGS
3.6.1 Temporary Roads
3.6.2 Ramps and Crossing
3.6.2.1 General
3.6.2.2 Changes in Ramp Dimensions or Locations
3.7 GRADE TOLERANCES
3.8 SETTLEMENT OF FOUNDATION
3.8.1 Settlement Gages
3.8.2 Sudden Failure
3.8.3 Omitting Work
3.9 SLIDES
3.10 FIELD TESTING CONTROL

SECTION 02230

EMBANKMENT

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 698	(1991; R 1998) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))
ASTM D 2216	(1998) Laboratory Determination of Water (Moisture) Content of Soil and Rock
ASTM D 2487	(1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1996) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

PART 2 PRODUCTS

2.1 EMBANKMENT MATERIALS

2.1.1 General

The levee embankment and closure (except for the 1.5 meter layer of graded stone "C" in the closure) shall be constructed of earth obtained from the borrow areas, ditches, and other required excavations as prescribed in Section 02222 EXCAVATION FOR LEVEES and to the extent shown on the drawings. The embankment shall be constructed of earth that is free from unsuitable and frozen materials as defined in paragraphs UNSUITABLE MATERIALS and FROZEN MATERIALS. Material classified by ASTM D 2487 as gravels (GW, GP, GM) and sands (SW, SP, SM) shall not be used unless suitably blended with less pervious material to the extent that it no longer classifies as these materials, unless otherwise specified.

2.1.2 Graded Stone "C"

Graded Stone "C" shall be as specified in Section 02380 STONE PROTECTION.

2.1.3 Unsuitable Materials

Materials which are classified as unsuitable for fill or backfill material are defined as masses of organic matter, sticks, branches, roots and other

debris. As earth may contain excessive amounts of wood, isolated pieces of wood will not be considered objectionable in the embankment provided their length does not exceed 300 millimeters, their cross-sectional area is less than 2500 square millimeters, and they are distributed throughout the fill. Not more than one percent (by volume) of objectionable material shall be contained in the earth material placed in each cubic meter of the levee or berm section. Pockets or zones of wood shall not be placed in the fill or backfill.

2.1.4 Frozen Materials

Under no circumstances shall frozen earth, snow, or ice be placed in any required embankment. The Contracting Officer may require the wasting of frozen material in order that construction may proceed and such material wasted, if directed by written order of the Contracting Officer, will be paid for as specified in Section 02222 EXCAVATION FOR LEVEES, paragraph WASTE MATERIALS.

PART 3 EXECUTION

3.1 FOUNDATION PREPARATION

3.1.1 General

After clearing and grubbing, the entire earth surface on or against which fill (not including uncompacted fill) is to be placed shall be thoroughly broken to a depth of 150 mm. If for any cause, this broken surface becomes compacted in such a manner that, in the opinion of the Contracting Officer, a plane of seepage or weakness might be induced, it shall again be adequately scarified before depositing material thereon. All scarifying and breaking of ground surface shall be done parallel to the centerline of the levee. All of the foregoing work shall be completed at least 60 m in advance of the levee embankment construction.

3.1.2 Drainage

Except as specified for uncompacted fill, the foundation receiving fill and all partially completed fill shall be kept thoroughly drained. Drainage to areas outside the right-of-way limits will be allowed only after the Contractor has obtained rights-of-way for such drainage in accordance with Section 01000 GENERAL CONTRACT REQUIREMENTS paragraph RIGHTS-OF-WAY from the appropriate landowner (See Section 02222 EXCAVATION FOR LEVEES, paragraph BORROW AREAS.)

3.1.3 Frozen Ground

No fill shall be placed upon frozen ground.

3.2 LEVEE EMBANKMENT CONSTRUCTION

3.2.1 Semicompacted Fill

3.2.1.1 General

The location and extent of the semicompacted fill shall be as shown on the drawings. Semicompacted fill shall not be placed in water. The materials for semicompacted fill shall be placed or spread in layers, the first layer not more than 150 mm in thickness and the succeeding layers not more than 300 mm in thickness prior to compaction. Layers shall be started full out

to the slope stakes and shall be carried substantially horizontal and parallel to the levee centerline with sufficient crown or slope to provide satisfactory drainage during construction. Benching into the slope of the existing embankment is required in order to place and compact the material in horizontal layers. The vertical face of the existing embankment resulting from the benching operation shall be a minimum of 300 mm in height but shall not exceed 600 mm in height. When the surface of any compacted layer is too smooth to bond properly with the succeeding layer, it shall be adequately scarified before the next layer is placed thereon.

3.2.1.2 Moisture Control for Semicompacted Fill

The Contractor shall control the moisture content of the semicompacted fill material to the extent necessary to obtain the required compaction. If the material is too wet, it shall either be stockpiled and allowed to drain before it is placed in the semicompacted embankment cross sections and/or the wet material shall be processed by discing and harrowing, if necessary, until the moisture content is reduced sufficiently. If the material is too dry, sufficient moisture shall be uniformly distributed in each layer before compacting.

3.2.1.3 Compaction for Semicompacted Fill

When the moisture content and conditions of the spread layers are satisfactory, each layer of semicompacted fill shall be compacted to a minimum of 90 percent of maximum dry density. The maximum dry density shall be determined by the Contractor from representative samples of each type of material in accordance with ASTM D 698, with at least one test performed for each 100,000 cubic meters of semicompacted embankment placed. Maximum density test results shall be furnished to the Contracting Officer prior to placing material.

3.3 Closure Embankment Construction

3.3.1 General

Before beginning channel closure fill, the drainage structure shall be complete and in operation. The Contractor will not be permitted to haul material for the channel closure across the completed structure. However the Contractor elects to haul material for the channel closure fill, he will be required to maintain flow through the drainage structure, at no additional cost to the Government. The uncompacted fill for the closure shall be as shown on the drawings. Uncompacted fill shall be placed in approximately horizontal layers not exceeding 1 meter in thickness. The layers shall be uniformly spread, distributed, and otherwise manipulated during placement to such an extent that individual loads of material deposited on the fill will not remain intact, and large, open voids in the fill will be eliminated. Layers shall be started full out to the slope stakes, and shall be carried in lifts approximately horizontal and parallel to the centerline with sufficient crown or slope to provide satisfactory drainage during construction. Where material must be placed in water, it shall be dumped until it reaches an elevation not less than 0.3 m above the water surface, or until it reaches an elevation at which a stable fill surface is obtained, before layer construction will be required. The first stage shall be construction of the upstream and downstream dikes as shown on the drawings beginning on one side of the waterway and progressing continuously across to the opposite side. Placement of fill in the water will not be permitted when the water elevation exceeds 11.4 m NGVD. The 1V on 3H side slopes of the dikes may require the use of a trackhoe or small

dragline to construct. These 1V on 3H side slopes shall be constructed as the dikes progress across the bayou. Fill material shall be deposited uniformly in such a manner as to ensure that any soft material in the foundation will be forced progressively outward from the section and not trapped within the base. Operation of equipment on the dikes shall be controlled so as to avoid formation of ruts and to obtain the maximum degree of compaction. If the stability of the closure is threatened by excessive settlement or other causes, the Contracting Officer will designate such changes in the cross section, sequence of operation, or rate and areas of placement as in his opinion may be necessary to attain a stable closure of adequate gross grade and cross section. The dikes shall be constructed as rapidly as practicable with the amount of plant that can be utilized efficiently on the first stage section. Upon completion of the dikes, the second stage consisting of unwatering all surface water in the area between the dikes shall begin. As the unwatering occurs, the interior 1V on 3H side slopes of the dikes shall be maintained. After the entire area between the dikes is unwatered, the displaced soft material resulting from constructing the dikes shall be excavated. This excavated material shall be disposed of in the borrow area. Next a 1.5 meter layer of graded stone "C" shall be placed on the channel bottom between the dikes from bank to bank of Little Haha Bayou Channel up to elevation 11.0 NGVD on both banks. In order to maintain the interior 1V on 3V dike slopes, the removal of displaced soft material accumulated between the dikes may have to be removed concurrently with placing the 1.5 m of stone. Placement of the stone shall be conducted in such a manner to progressively force any remaining soft material outward from under the base. When the amount of soft material on the leading edge of the stone is too much to be displaced by the stone, the Contractor shall excavate the soft material in advance of the stone placement until displacement fill operations can be resumed. Any displaced material shall be removed prior to constructing compacted fill. Depending on the foundation conditions after unwatering between the dikes, the Contracting Officer may modify the contract to delete the stone and proceed with compacted fill. No interior construction slope shall be steeper than design slopes shown. The Contractor shall maintain drainage of the surface of the fill. Stockpiling of fill material or excavated soft material on the closure will not be permitted. After completion of the stages described above, the remainder of the closure shall be constructed in layers as specified in paragraph COMPACTED FILL. Each layer shall be started from the same bank of the waterway and shall be placed progressively across the waterway over the entire area of the fill within the limits of the gross cross sections before commencing a succeeding layer. A two week waiting period is required after the compacted fill reaches elevation 11.5 m. The compacted fill above elevation 11.5 shall be placed at a rate not to exceed 1 meter per week.

3.3.2 Uncompacted Fill

The uncompacted fill for the closure shall be as shown on the drawings. Uncompacted fill shall be placed in approximately horizontal layers not exceeding 1 meter in thickness. The layers shall be uniformly spread, distributed, and otherwise manipulated during placement to such an extent that individual loads of material deposited on the fill will not remain intact, and large, open voids in the fill will be eliminated. Layers shall be started full out to the slope stakes, and shall be carried in lifts approximately horizontal and parallel to the centerline with sufficient crown or slope to provide satisfactory drainage during construction. Where material must be placed in water, it shall be dumped until it reaches an elevation 0.3 m above the water surface, or until a stable fill surface is obtained before layer construction will be required. The material

deposited under water shall be placed in such a manner to ensure that any soft material will be forced progressively outward from the section and not be trapped within the base.

3.3.3 Compacted Fill

3.3.3.1 General

The compacted embankment for the closure shall be as shown on the drawings. The materials for compacted fill shall be placed or spread in layers not more than 150 mm in loose thickness prior to compaction. Layers shall be started full out to the slope stakes and shall be carried substantially horizontal and parallel to the centerline of the closure with sufficient crown or slope to provide satisfactory drainage during construction. When the surface of any compacted layer is too smooth to bond properly with the succeeding layer, it shall be adequately scarified before the next layer is placed thereon.

3.3.3.2 Moisture Control for Compacted Fill

The Contractor shall control the moisture content of the compacted embankment material to the extent necessary to obtain the required compaction. If the material is too wet, it shall either be stockpiled and allowed to drain before it is placed in the compacted embankment cross sections and/or the wet material shall be processed by discing and harrowing, if necessary, until the moisture content is reduced sufficiently. If the material is too dry, sufficient moisture shall be uniformly distributed in each layer before compacting.

3.3.3.3 Compaction for Compacted Fill

When the moisture content and conditions of the spread layers are satisfactory, each layer of compacted embankment shall be compacted to a minimum of 95 percent of maximum dry density. The maximum dry density shall be determined by the Contractor from representative samples of each type of material in accordance with ASTM D 698, with at least one test performed for each 100 cubic meters of compacted embankment placed. Maximum dry density test results shall be furnished to the Contracting Officer prior to placing material.

3.4 DRESSING

The entire embankment shall be brought to not less than the prescribed gross cross section, within allowable tolerance, at all points. Unreasonable roughness of surface shall be dressed out to permit turfing operations.

3.5 CROSS SECTIONS AND ZONING OF MATERIALS

3.5.1 Levee Embankment Sections

Unless otherwise specified, the dimensions and slopes shall conform to the applicable cross sections shown on the drawings, within allowable tolerance.

3.5.2 Zoning of Materials for Levee Construction

In general, the levee section shall be homogeneous; however, where materials of varying permeabilities are encountered in the borrow areas, the more impervious material shall be placed toward the riverside slope,

and the more pervious material shall be placed toward the landside slope.

3.6 ROADS, RAMPS, AND CROSSINGS

3.6.1 Temporary Roads

At locations where existing roads are destroyed because of the work required under this contract, the Contractor shall provide temporary roads to give access during the construction period. The temporary roads shall be constructed by placement of fill as specified in paragraph SEMICOMPACTED FILL. The temporary roads shall be removed after permanent access has been provided. No separate payment will be made for this work.

3.6.2 Ramps and Crossing

3.6.2.1 General

Ramps and crossings shall be constructed at the locations shown on the drawings by placement of a fill as specified in paragraph SEMICOMPACTED FILL. Ramps shall be constructed only by adding material to the levee crown and slopes and shall be open to public traffic at all times during construction. Ramps shall have a 6 meter crown width, a grade not to exceed 10 percent, and 1V on 3H side slopes. Payment for materials used for ramp construction will be included in the contract lump sum price for "Ramps and Road Crossings".

3.6.2.2 Changes in Ramp Dimensions or Locations

The Contracting Officer reserves the right to modify the dimensions and/or shift the locations of the ramps to eliminate ramp construction and/or order the construction of additional ramps at other locations. Any additional costs incurred by the Contractor for additional ramps or modified ramp dimensions will be paid for in accordance with the Contract Clause CHANGES.

3.7 GRADE TOLERANCES

All embankments shall be constructed to the gross grade and cross section shown on the drawings. For semicompacted fill at all points above or below the prescribed gross grade and cross section shown will be permitted in the final dressing provided that the crown of the levee drains, there are no abrupt humps or depressions in surfaces or bulges in the width of the crown, and the side slopes are uniform. Any partial fill or temporarily stockpiled material placed within the gross section shall not exceed the gross grade or gross slopes of the embankment by more than 600 mm, and shall have side slopes not steeper than 1V on 3H.

3.8 SETTLEMENT OF FOUNDATION

3.8.1 Settlement Gages

Should the Contractor desire payment for placing additional fill due to foundation settlement during construction, he shall furnish and install settlement gages for determination of such settlement. Prior to placing of fill material, each gage shall be installed on the prepared foundation at intervals not to exceed 91 m, and shall be maintained during construction. Settlement gages at each end of the work shall be placed within 46 m of the upper and lower limits of the work. Each gage shall be set on a smooth level surface on undisturbed ground. Leveling of gage beds shall be

accomplished by removing the minimum amount of earth necessary to produce an even foundation and in such manner that the density of gage beds will remain at the same density as the undisturbed adjacent ground. Leveling of gage beds by the addition of fill will not be permitted. The gages shall be steel plates with minimum dimensions of 600 mm by 600 mm by 38 mm. The Contractor shall determine elevations of the gages prior to placing of fill material, and again within 72 hours after final cross sections have been taken over the completed embankment at the sites of the gages to determine settlement of the foundation. The 72 hour requirement is an absolute pre-condition for payment for settlement of the foundation. The initial and final elevation of the gages will be verified by the Contracting Officer's representative at the site. Measurement of additional fill material placed by reason of settlement of the foundation will be as stated in Section 01025 MEASUREMENT AND PAYMENT, paragraph UNIT PRICE ITEMS. Installation of and measurement on gages shall be at the option and expense of the Contractor. When the settlement gage is located by boring with a rotary drill, the drill hole shall be backfilled with embankment material and tamped throughout. At the Contractor's option, the drill hole may be filled with a neat cement grout tremied from the bottom of the drill hole to the top of the drill hole.

3.8.2 Sudden Failure

In clearly established cases of sudden failure of the foundation, either where no provision has been made for the measurement of settlement or where settlement measuring devices have been installed, but the nature of settlement is such as to destroy their utility, the settlement shall be determined by borrow area measurement. Measured borrow area volumes shall be converted to embankment volume by applying a factor of 1.10 to 1 for change in volume from borrow area to fill.

3.8.3 Omitting Work

Where settlement of the foundation develops to such an extent as to make it inadvisable, in the opinion of the Contracting Officer, to continue to add material, and advisable in his opinion, to postpone all attempts to bring that portion of the embankment to full grade and cross section, the Contracting Officer shall have the right to omit further work on that portion of the embankment and to accept it as completed.

3.9 SLIDES

Should sliding occur in any part of the embankment during its construction, or after its completion, but prior to its acceptance, the Contractor shall upon written order of the Contracting Officer, either cut out and remove the slide from the embankment and then rebuild that portion of the embankment, or construct a stability berm of such dimensions, and placed in such manner, as the Contracting Officer shall prescribe. In case the slide is caused through the fault or negligence of the Contractor, the foregoing operations shall be performed at no additional cost to the Government. In case the slide is not caused through the fault or negligence of the Contractor, the material ordered removed will be paid for as specified in Section 02222 EXCAVATION FOR LEVEES, paragraph WASTE MATERIALS, and the material replaced. Fill material will be paid for as specified in Section 01025 MEASUREMENT AND PAYMENT, for "LEVEE EMBANKMENT, SEMCOMPACTED", in addition to any payment due the Contractor for materials previously placed. The method of slide correction will be determined by the Contracting Officer.

3.10 FIELD TESTING CONTROL

Testing shall be the responsibility of the Contractor and shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval. Field density tests shall be performed on every 800 cubic meters of semicompacted material placed, and on every 100 cubic meters of compacted material placed. Field in-place density shall be determined in accordance with ASTM D 2922. Moisture content tests shall be in accordance with ASTM D 2216 or ASTM D 3017. Calibration checks of both the density and moisture gages shall be made at the beginning of a job on each different type of material encountered and at intervals as directed. The Contractor shall submit daily records of control tests and reports as well as records of corrective action taken in accordance with Section 01451 CONTRACTOR QUALITY CONTROL.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02301

LEVEE SURFACING

PART 1 GENERAL

1.1 REFERENCES
1.2 LOCATIONS AND DIMENSIONS

PART 2 PRODUCTS

2.1 MATERIALS
2.1.1 General
2.1.2 Sand-Clay-Gravel
2.1.3 Crushed Stone
2.1.4 Filler for Blending
2.2 EQUIPMENT

PART 3 EXECUTION

3.1 PREPARATION
3.2 MOISTURE CONTROL
3.3 PLACING NEW SURFACING MATERIAL
3.4 TESTING

-- End of Section Table of Contents --

SECTION 02301

LEVEE SURFACING

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO T 27	(1993) Sieve Analysis of Fine and Coarse Aggregates
AASHTO T 96	(1994) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 4318	(1996) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.2 LOCATIONS AND DIMENSIONS

The locations and dimensions of the sand-clay-gravel or crushed stone surfacing shall be as shown on the drawings.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 General

The Contractor shall provide only the type of surfacing material that he optioned to bid under the item "Levee Surfacing" contained in the Bidding Schedule, and as specified herein. (See also the "Notes" to the Bidding Schedule.)

2.1.2 Sand-Clay-Gravel

The new sand-clay-gravel material shall be composed of a natural mixture of hard, durable particles of gravel mixed with sand and clay and shall meet the following gradation requirements:

U.S. STD. SQUARE MESH SIEVE DESIGNATIONS	PERCENTAGE BY WEIGHT PASSING (AASHTO T 27 METHOD OF TEST)
50 mm	100
37.5 mm	95 - 100
25 mm	75 - 100
12.5 mm	45 - 90

U.S. STD. SQUARE MESH SIEVE DESIGNATIONS	PERCENTAGE BY WEIGHT PASSING (AASHTO T 27 METHOD OF TEST)
4.75 mm	30 - 65
2.00 mm	20 - 50
425 µm	10 - 30
75 µm	5 - 15

The fraction of the material passing the 75 µm sieve shall be less than one-half that of the fraction passing the 425 µm sieve. The portion of the binder material passing the 425 µm sieve shall have a liquid limit of not more than 30 and a plasticity index of not more than 15 nor less than 5 as determined by ASTM D 4318. Any material that does not meet these requirements shall be stabilized with either sand, sand-clay, or gravel; in such proportions that the finished surface course will meet the requirements of the specified gradation. The coarse aggregate shall have a percentage of wear not to exceed 50 after 500 revolutions of testing via the Los Angeles Testing Machine in accordance with AASHTO T 96. If material from the source has previously met this wear test, it need not be repeated.

2.1.3 Crushed Stone

Crushed stone material shall be from a source approved by the Contracting Officer and shall conform to the following gradations:

U.S. STD. SQUARE MESH SIEVE DESIGNATIONS	PERCENTAGE BY WEIGHT PASSING (AASHTO T 27)
37.5 mm	100
19.0 mm	50 - 95
12.5 mm	42 - 85
4.75 mm	25 - 65
425 µm	10 - 32
75 µm	3 - 12

The fraction of the material passing the 425 µm sieve shall have a liquid limit of not more than 25 and a plasticity index of not more than 6. The coarse aggregate shall have a percentage of wear not to exceed 50 after 500 revolutions of testing via the Los Angeles Testing Machine in accordance with AASHTO T 96. If material from the source has previously met this wear test, it need not be repeated.

2.1.4 Filler for Blending

In addition to the filler material that is naturally present in the surface course material, the filler material, that is necessary for meeting the requirements or for satisfactory binding of the material, shall be uniformly blended with the surface course material before it is delivered to the job site. The material for such purpose shall be approved by the Contracting Officer, shall be free from hard lumps and shall not contain more than 15 percent of material retained on a 4.75 mm sieve.

2.2 EQUIPMENT

The new sand-clay-gravel or crushed stone shall be delivered in vehicles approved by the Contracting Officer. Each vehicle shall bear a plainly legible identification mark.

PART 3 EXECUTION

3.1 PREPARATION

The crown of the levee and ramps shall be bladed and shaped prior to the placement of the sand-clay-gravel or crushed stone surfacing. The centerline of the roadway shall be approximately 50 mm higher than the outer edge of the roadway crown and the crown shall be heeled to each side into a windrow that can be dressed against the new surfacing to hold it in place.

3.2 MOISTURE CONTROL

No moisture control will be required for new surfacing material unless the desired compaction is not being obtained due to the material being too wet or too dry. In such cases, the Contractor will be required to perform moisture control as follows. If the material is too wet, it shall either be stockpiled and allowed to drain before it is placed, or the wet material shall be dried by successive blading until the moisture content is sufficiently reduced. If the material is too dry, sufficient moisture shall be uniformly distributed by approved methods before beginning compaction. No additional payment will be made for performing moisture control as specified above.

3.3 PLACING NEW SURFACING MATERIAL

A surfacing course of new sand-clay-gravel material (only if Option A - Sand-Clay-Gravel is bid), or new crushed stone material (only if Option B - Crushed Stone is bid), shall be placed and spread uniformly on the crown of the levee and ramps. The Contractor shall not dump any load until it has been inspected and weighed in accordance with Section 01025 MEASUREMENT AND PAYMENT. The new surfacing shall be placed in one 225 mm loose measure layer of sand-clay-gravel, or one 175 mm loose measure layer of crushed stone, at the widths shown on the drawings. The surfacing shall not be placed on a wet surface. The surface course shall be compacted as evenly and densely as practicable by the controlled movement of the hauling equipment over the entire area. After the new surfacing material has been placed and compacted, it shall be dressed with a motor grader or similar equipment to present a uniform appearance and a smooth riding surface, without sharp breaks or depressions which will collect or hold water.

3.4 TESTING

The Contractor shall determine the percentage of wear, gradation, liquid limit, plasticity index, and sieve analyses of the new sand-clay-gravel or crushed stone surfacing material. As a minimum for each quarry, the surfacing material shall be tested once before beginning placement and once for each 1,200 metric tons placed. After placement begins, samples for tests shall be taken from material that has been delivered to the job site. The on-site Government representative shall be notified when a sample is to be taken for each test and be given the opportunity to witness the taking of each sample. The Contracting Officer may direct additional testing under the Contract Clause INSPECTION OF CONSTRUCTION if the material appears by visual inspection to not meet the specifications.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02380

STONE PROTECTION

PART 1 GENERAL

1.1 REFERENCES
1.2 GOVERNMENT TESTING AND STUDIES
1.2.1 Stone
1.2.1.1 General
1.2.1.2 Sources
1.3 SUBMITTALS

PART 2 PRODUCTS

2.1 FILTER MATERIAL
2.2 RIPRAP AND GRADED STONE
2.2.1 General
2.2.2 Evaluation Testing
2.2.3 Gradation Test
2.2.4 Riprap and Graded Stone Stockpile
2.2.5 Worksite Stockpile
2.2.6 Off-site Stockpile

PART 3 EXECUTION

3.1 BASE PREPARATION
3.2 PLACEMENT OF FILTER LAYERS
3.2.1 General
3.2.2 Engineering Fabric
3.3 PLACEMENT OF RIPRAP AND GRADED STONE
3.3.1 General
3.3.2 Placement
3.4 TESTS
3.4.1 General
3.4.2 Reporting
3.4.3 Standard Test Method for Gradation of Riprap and Graded Stone

-- End of Section Table of Contents --

SECTION 02380

STONE PROTECTION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 127	(1988; R 1993) Specific Gravity and Absorption of Coarse Aggregate
ASTM C 295	(1990) Petrographic Examination of Aggregates for Concrete

CORPS OF ENGINEERS (COE)

COE CRD-C 144	(1973) Testing Stone for Resistance to Freezing and Thawing
COE CRD-C 169	(1993) Resistance of Rock to Wetting and Drying

1.2 GOVERNMENT TESTING AND STUDIES

1.2.1 Stone

1.2.1.1 General

All stone shall be durable material as approved by the Contracting Officer. In case an unlisted source is to be used, the Contractor shall show that an adequate quantity of material is available and provide quality test data. Stone shall be of a suitable quality to ensure permanence in the structure and in the climate in which it is to be used. It shall be free from cracks, seams and other defects that would tend unduly to increase its deterioration from natural causes. The stone shall be clean and reasonably free from earth and dust and shall contain no refuse.

1.2.1.2 Sources

Stone shall be furnished from any of the sources listed at the end of this section, or at the option of the Contractor may be furnished from any other source designated by the Contractor and accepted by the Contracting Officer, subject to the conditions herein stated. If the Contractor proposes to furnish stone from a source not currently listed at the end of this section, the Government will conduct a quarry investigation and evaluate the quality test data provided by the Contractor to determine whether acceptable stone can be produced from the proposed source. Satisfactory service records on other work may be acceptable. In order for stone to be acceptable on the basis of service records, stone of a similar size must have been placed in a similar thickness and exposed to weathering

under similar conditions as are anticipated for this contract, and must have satisfactorily withstood such weathering for a minimum of 20 years.

a. List of Sources. On the basis of information and data available to the Contracting Officer, stone meeting the quality requirements of these specifications has been produced from the sources listed at the end of this section.

b. Selection of Source. The Contractor shall designate in writing only one source or one combination of sources from which he proposes to furnish stone. If the Contractor proposes to furnish stone from a source not listed at the end of this section, he may designate only a single unlisted source for stone and he shall notify the Contracting Officer at least 60 workdays before the stone leaves the quarry. It is the Contractor's responsibility to determine that the stone source or combination of sources selected is capable of supplying the quantities and gradation needed and at the rate needed to maintain the scheduled progress of the work. Samples for acceptance testing shall be provided in accordance with paragraph EVALUATION TESTING. If a source for stone so designated by the Contractor is not accepted for use by the Contracting Officer, the Contractor may not propose other sources but shall furnish the stone from a source listed at the end of this section at no additional cost to the government.

c. Acceptance of Materials. Acceptance of a source of stone is not to be construed as acceptance of all material from that source. The right is reserved to reject materials from certain localized areas, zones, strata, or channels, when such materials are unsuitable for stone as determined by the Contracting Officer. Materials produced from a listed or unlisted source shall meet all the requirements herein.

1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-09 Reports

Gradation Test; FIO. Evaluation Tests; FIO.

The gradation tests shall be submitted using the GRADATION TEST DATA SHEET enclosed at end of this section.

Quality test on the stone in accordance with paragraph EVALUATION TESTING shall be the responsibility of the Contractor and submitted for approval prior to delivery of such material to the worksite.

SD-13 Certificates

Riprap; FIO. Laboratory; FIO.

Certificates of compliance attesting that the materials meet specification requirements shall be submitted to the Contracting Officer.

A copy of the testing laboratory's certification and inspection report shall be submitted along with actions taken to correct deficiencies.

PART 2 PRODUCTS

2.1 FILTER MATERIAL

Filter material for the riprap shall consist of engineering fabric. Engineering fabric shall be as specified in Section 02213 ENGINEERING FABRIC.

2.2 RIPRAP AND GRADED STONE

2.2.1 General

Only quarried stone shall be used. Riprap and graded stone quality shall be as specified in paragraph GOVERNMENT TESTING AND STUDIES, subparagraph STONE. Gradation shall conform to the table(s) below and to the plate(s) attached at the end of this section. A maximum of 10 percent flat and elongated pieces will be acceptable. A flat and elongated piece of stone is defined as a stone with either the width or thickness of the piece being less than one-third of the length.

TABLE I
(FOR RIPRAP "M40")

PERCENT LIGHTER BY WEIGHT (SSD)	LIMITS OF STONE WEIGHT, kg
100	40 - 20
50	20 - 10
15	10 - 2.5

TABLE II
(FOR RIPRAP "M300")

PERCENT LIGHTER BY WEIGHT (SSD)	LIMITS OF STONE WEIGHT, kg
100	300 - 120
50	130 - 60
15	60 - 20

TABLE III
(FOR GRADED STONE "C")

PERCENT LIGHTER BY WEIGHT (SSD)	LIMITS OF STONE WEIGHT, kg
100	180
70 - 100	115
50 - 80	45
32 - 58	15
15 - 34	2.5
2 - 20	0.5

2.2.2 Evaluation Testing

If the Contractor proposes to furnish stone from an unlisted source, the

Contractor shall have evaluation tests performed on stone samples collected from the proposed source. The tests to which the stone shall be subjected include petrographic examination (ASTM C 295), specific gravity, unit weight, and absorption (ASTM C 127), resistance of stone to freezing and thawing (COE CRD-C 144), and if sandstone is used, resistance to wetting and drying in accordance with (COE CRD-C 169).

a. Unit Weight and/or Absorption. Stone shall weigh more than 2 480 kg/cubic meter. The stone shall have an absorption less than 2 percent unless other tests and service records show that the stone is satisfactory. The method of test for unit weight and absorption will be ASTM C 127, except the unit weight will be calculated in accordance with Note No. 5 using bulk specific gravity, saturated surface dry.

b. Resistance to Freezing and Thawing. Stone when tested in accordance with COE CRD-C 144 shall have a loss of less than 5 percent.

c. Resistance to Wetting and Drying. This test shall only be required to be performed on sandstone samples. When tested in accordance with COE CRD-C 169 (35 cycles), there shall be a loss of less than one percent.

d. Samples. Samples of stone from a source not listed at the end of this section shall be taken by a representative of the Quarry under the supervision of the Contracting Officer for testing and acceptance prior to delivery of any stone from this source to the site of the work. Samples shall consist of at least three pieces of stone, roughly cubical in shape and weighing not less than 34 kg each. The samples shall be shipped at the Contractor's expense to a laboratory certified by the government to perform the required tests.

e. Tests. The tests shall be conducted by the Contractor in accordance with applicable Corps of Engineers methods of tests given in the Handbook for Concrete and Cement, and shall be performed at a laboratory certified by the government. The cost of testing shall be borne by the Contractor.

2.2.3 Gradation Test

The Contractor shall perform a gradation test or tests on the riprap and graded stone at the quarry in accordance with paragraph STANDARD TEST METHOD FOR GRADATION OF RIPRAP AND GRADED STONE. The sample shall be taken by the Contractor in the presence of the Contracting Officer. The Contractor shall notify the Contracting Officer not less than 3 days in advance of each test. In the event of unavailability of a Government representative; the Contractor shall perform the tests and certify to the Contracting Officer that the riprap and graded stone shipped complies with the specifications. At least one gradation test shall be performed per 50,000 tons (metric) of each size of riprap and graded stone placed, but not less than one test shall be performed. The gradation tests shall be reported using the forms, GRADATION TEST DATA SHEET and ENG FORM 4794-R, attached at end of this section. The Contractor shall designate on the test form that portion in tons (metric) of the lot tested which is applicable to this contract. Any deviation from the reported tonnage shall be corrected and recorded on a revised GRADATION TEST DATA SHEET. The sample shall consist of not less than 15 tons (metric) of M40 riprap, 25 (metric)tons of M300 riprap, and 25 tons (metric) of graded stone "C", and shall be collected in a random manner which will provide a sample which accurately reflects the actual gradation arriving at the jobsite. Failure

of the test on the initial sample and on an additional sample will be considered cause for rejection of the quarry and/or quarry process, and all riprap and graded stone represented by the failed tests shall be set aside and not incorporated into the work. Any additional tests required because of the failure of an initial test sample will not be considered as one of the other required tests. If collected by the truckload, each truckload shall be representative of the gradation requirements. The Contracting Officer may direct additional testing of the riprap or graded stone at the project site if either appears by visual inspection, to be out of gradation. The Contracting Officer may direct this testing under the Contract Clause INSPECTION OF CONSTRUCTION. The Contractor shall provide all necessary screens, scales and other equipment, the operating personnel, and shall grade the sample. Certification and test results shall represent riprap and graded stone shipped from the quarry. Certification and tests results must be received by the Contracting Officer at the jobsite before the riprap or graded stone is used in the work.

2.2.4 Riprap and Graded Stone Stockpile

Temporary storage of riprap and graded stone at the worksite is not to be confused with off-site stockpiling. If the Contractor elects to provide off-site stockpiling areas, the Contracting Officer shall be notified by the Contractor of all such areas.

2.2.5 Worksite Stockpile

Riprap and graded stone delivered to the work sites, which requires temporary storage landward of top bank, shall be placed in a container suitable for storing the riprap or graded stone without waste, or a sand-clay-gravel or crushed stone pad may be constructed for the storage area and removed upon completion of the work. If the sand-clay-gravel or crushed stone pad method is used, the pad shall have a minimum thickness of at least 150 mm. The container or sand-clay-gravel or crushed stone pad method shall be subject to approval prior to delivery of the riprap or graded stone. Upon completion of the work, the storage areas shall be cleaned of all storage residues and returned to their natural condition. Temporary storage of riprap and graded stone at the worksite will be allowed, provided the stream-side toe of the riprap or graded stone be no closer than 36 m from the closest edge of the stream's top bank, and the amount shall not exceed 200 tons (metric) unless otherwise approved. The Contractor's jobsite stockpile shall be a maximum of 3.6 m high and formed by a series of layers of truckload dumps, where the rock essentially remains where it is placed. Subsequent layers shall be started 3 m from the edge of the previous layer so that the rock will not roll down the edges of the previous layers. The first layer shall be a maximum of 2 m high. Any riprap or graded stone which has become contaminated with soil, dirt, or refuse after being stockpiled, will not be put into the work unless the contaminating material has been removed from the riprap or graded stone prior to placement.

2.2.6 Off-site Stockpile

The Contractor's off-site riprap and graded stone stockpile shall be a maximum of 3.6 m high and formed by a series of layers of truckload dumps, where the rock essentially remains where it is placed. Subsequent layers shall be started 3 m from the edge of the previous layer so that the rock will not roll down the edges of the previous layers. The first layer shall be a maximum of 2 mhigh. Any riprap or graded stone which has become contaminated with soil, dirt, or refuse after being stockpiled, will not be

put into the work unless the contaminating material has been removed from the riprap or graded stone prior to placement. In areas where riprap or graded stone is stockpiled for placement, the area shall have excess rock removed prior to completion of work. All rock and spalls greater than 75 mm in diameter shall be removed. Where rocks may have become buried due to soft ground or operation of the equipment, the rock shall be disposed of as directed. After the rock has been removed, the storage area shall be graded, dressed, and filled to return the ground surface as near as practical to the condition that existed prior to construction.

PART 3 EXECUTION

3.1 BASE PREPARATION

Areas on which engineering fabric and riprap are to be placed shall be graded and/or dressed to conform to cross sections shown on the contract drawings within an allowable tolerance of plus 50 mm and minus 100 mm from the theoretical slope lines and grades. The prepared base shall be approved by the Contracting Officer. Where such areas are below the allowable minus tolerance limit they shall be brought to grade by fill with earth similar to the adjacent material and then compacted to a density equal to the adjacent in place material. Immediately prior to placing the engineering fabric, the prepared base will be inspected by the Contracting Officer and no material shall be placed thereon until that area has been approved. The area of the closure on which the graded stone is to be placed shall be free of soft material as is specified in Section 02230 EMBANKMENT and as determined by the Contracting Officer.

3.2 PLACEMENT OF FILTER LAYERS

3.2.1 General

A filter layer, composed of engineering fabric, shall be placed on the prepared base as described below, in accordance with the details shown on the contract drawings, and within the limits either shown on the contract drawings or staked in the field, to form a backing for the stone protection.

3.2.2 Engineering Fabric

Installation of engineering fabric shall be as specified in Section 02213 ENGINEERING FABRIC.

3.3 PLACEMENT OF RIPRAP AND GRADED STONE

3.3.1 General

Riprap shall be placed on the filter layer (engineering fabric) specified in paragraph FILTER MATERIAL within the limits shown on the drawings. Graded stone shall be placed as specified for the closure in Section 02230 EMBANKMENT and within the limits shown on the drawings.

3.3.2 Placement

Riprap shall be placed in such manner as to produce a reasonably well graded mass of rock with the minimum practicable percentage of voids, and shall be constructed within the specified tolerance to the lines and grades shown on the drawings. A tolerance of plus 50 mm or minus 100 mm from the slope lines and grades shown on the drawings will be allowed in the finished surface of the riprap, except that either extreme of such

tolerance shall not be continuous over an area greater than 18 square meters The average tolerance of the entire job shall have no more than 50 percent of the tolerance specified above. No stone shall be dropped through air from a height greater than 1 m and stones heavier than 225 kg shall not be dropped from a height greater than 600 mm. The larger stones shall be well distributed and the entire mass of stones in their final position shall be roughly graded to conform to the gradation specified in paragraph RIPRAP AND GRADED STONE, subparagraph GENERAL. The finished riprap shall be free from objectionable pockets of small stones and clusters of larger stones. Placing riprap in layers will not be permitted. Placing riprap by dumping into chutes or by similar methods likely to cause segregation of the various sizes will not be permitted. Placing riprap by dumping it at the top of the slope and pushing it down the slope will not be permitted. No equipment shall be operated directly on the completed stone protection system. The desired distribution of the various sizes of stones throughout the mass shall be obtained by selective loading of the material at the quarry or other source; by controlled dumping of successive loads during final placing, or by other methods of placement which will produce the specified results. All dump trucks used in placing the riprap shall be equipped with bottom hinged tailgates. The gate releasing mechanism shall be arranged so that it may be operated only from, at, or near the front of the truck. Rearranging of individual stones will be required to the extent necessary to obtain a reasonably well-graded distribution of stone sizes as specified above. The Contractor shall maintain the stone protection until accepted by the Contracting Officer and any material displaced by any cause shall be replaced at his expense to the lines and grades shown on the drawings.

3.4 TESTS

3.4.1 General

The Contractor shall perform gradation tests to assure compliance with contract requirements and shall maintain detailed records.

3.4.2 Reporting

Reporting shall be in accordance with paragraph GRADATION TEST.

3.4.3 Standard Test Method for Gradation of Riprap and Graded Stone

a. Select a representative sample (Note No. 1), weigh and dump on hard stand.

b. Select specific sizes (see example) on which to run "individual weight larger than" test. (See Note No. 2). Procedure is similar to the standard aggregate gradation test for "individual weight retained".

c. Determine the largest size stone in the sample. (100 percent size)

d. Separate by "size larger than" the selected weights, starting with the larger sizes. Use reference stones, with identified weights, for visual comparison in separating the obviously "larger than" stones. Stones that appear close to the specific weight must be individually weighed to determine size grouping. Weight each size group, either individually or cumulatively.

e. Paragraph d above will result in "individual weight retained" figures. Calculate individual percent retained (heavier than)

cumulative percent retained and cumulative percent passing (lighter than). Plot percent passing, along with the specification curve on ENG Form 4794-R.

NOTE NO. 1: Sample Selection: The most important part of the test and the least precise is the selection of a representative sample. No "standard" can be devised; larger quarry run stone is best sampled at the shot or stockpile by given direction to the loader; small graded stone is best sampled by random selection from the transporting vehicles. If possible, all parties should take part in the sample selection, and agree before the sample is run, that the sample is representative.

NOTE NO. 2: Selection of Size for Separation: It is quite possible and accurate to run a gradation using any convenient sizes for the separation, without reference to the specifications. After the test is plotted on a curve, then the gradation limits may be plotted. Overlapping gradations with this method are no problem. It is usually more convenient, however, to select points from the gradation limits, such as the minimum 50 percent size, the minimum 15 percent size, and one or two others, as separation points.

F O R

E X A M P L E

O N L Y

EXAMPLE GRADATION
SPECIFICATIONS

STONE WEIGHT IN KG	PERCENT LIGHTER BY WEIGHT
180-75	100
75-35	50
35-15	15

EXAMPLE WORKSHEET

STONE SIZE KG	INDIVIDUAL WT. RETAINED	INDIVIDUAL PERCENT RETAINED	CUMULATIVE RETAINED	PERCENT PASSING
180	0	0	0	100
75	4,354	30	30	70
35	5,080	35	65	35
15	3,629	25	90	10
-15	1,451	10	100	-
TOTAL	14,514 kg			

NOTE: Largest stone 114 kg

-- End of Section --

STONE SOURCES

LAT/LONG (TESTED)	QUARRY LOCATION, ADDRESS AND TELEPHONE NUMBER	MAIN OFFICE ADDRESS AND TELEPHONE NUMBER
	ALABAMA	
34/88 (1995)	Allsboro Quarry is located 8 miles east of intersection of MS Hwy 25 and Tishomingo County Rd 957 at Midway, MS, just across AL state line. Hoover Incorporated P.O. Box 613 Iuka, MS 38852 (205) 360-2400	Hoover Incorporated 1205 Bridgestone Parkway P.O. Box 17000 LaVergne, TN 37086-17000 (615) 793-2600
34/87 (1995)	Cherokee Quarry is located 3 miles east of Cherokee, AL on old Hwy 72.	Vulcan Materials Co. P.O. Box 459 Cherokee, AL 35616 (205) 359-6404
	ARKANSAS	
34/92 (1997)	Granite Mountain Quarry #1 is located on east side of Hwy 65 and just north of Dixie Road	McGeorge Corporation P.O. Box 138 Sweet Home, AR 72164 (501) 490-1535
36/91 (1995)	Valley Stone Quarry is located 4.5 miles northwest of Black Rock, AR off U.S. Hwy 63	Meridian Aggregates Co. P.O. Box 260 Black Rock, AR 72415 (870) 878-6201
34/95 (1996)	River Mountain Quarry is located approx. 5 miles northwest of Delaware, AR, at AR River Mile 218.5.	Pine Bluff Sand and Gravel P.O. Box 7008 Pine Bluff, AR 71611-7008 (870) 534-7120
	KENTUCKY	
37/87 (1996)	Cedar Bluff Quarry is located 3 miles south of Princeton, KY on KY. Hwy 91. The Kentucky Stone Co. 10234 Hopkinsville Rd. Princeton, KY 42445 (502) 365-6881	The Kentucky Stone Co. P.O. Box 7529 Louisville, KY 40207 (502) 897-1731
37/88 (1996)	Three Rivers Quarry is located 7 miles northeast of Smithland, KY, off Hwy 60 (Cumberland Road)	Martin Marietta Aggregates 830 Three Rivers Quarry Rd. Smithland, KY 42081 (502) 928-2141

STONE SOURCES
(Continued)

LAT/LONG (TESTED)	QUARRY LOCATION, ADDRESS AND TELEPHONE NUMBER	MAIN OFFICE ADDRESS AND TELEPHONE NUMBER
37/88 (1996)	Gilbertsville Quarry is located on U.S. Hwy 62 "Between the Dams" Lake City, KY.	Vulcan Materials Co. Reed/BRT Operations 947 U.S. Hwy. 62 Grand Rivers, KY 42045 (502) 362-4265
	MISSOURI	
37/89 (1995)	Gray's Point Quarry is located at MRM 46.2, above the mouth of the Ohio River.	Tower Rock Stone Co. P.O. Box 50 Columbia, IL 62236 (618) 281-4106
	Tower Rock Stone Co. P.O. Box 4248 Scott City, MO 63780 (573) 264-3800	
38/90 (1995)	Bussen Quarry is located 5 miles north of St. Genevieve, MO, MRM 127.6, above the mouth of the Ohio River.	Tower Rock Stone Co. P.O. Box 50 Columbia, IL 62236 (618) 281-4106
	Tower Rock Stone Co. P.O. Box 111 St. Genevieve, MO 63670 (573) 883-7415	

G R A D A T I O N T E S T D A T A S H E E T

Quarry _____ Type of Stone Tested _____

Date of Test _____ Testing Rate _____

T E S T R E P R E S E N T S

Contract No.	District	Tons
	TOTAL	

G R A D A T I O N

Stone Size (lbs)	Weight Retained	Individual % Retained	Cumulative % Ret.	Cumulative % Pass	Specification % Finer by wt
Total Wt					

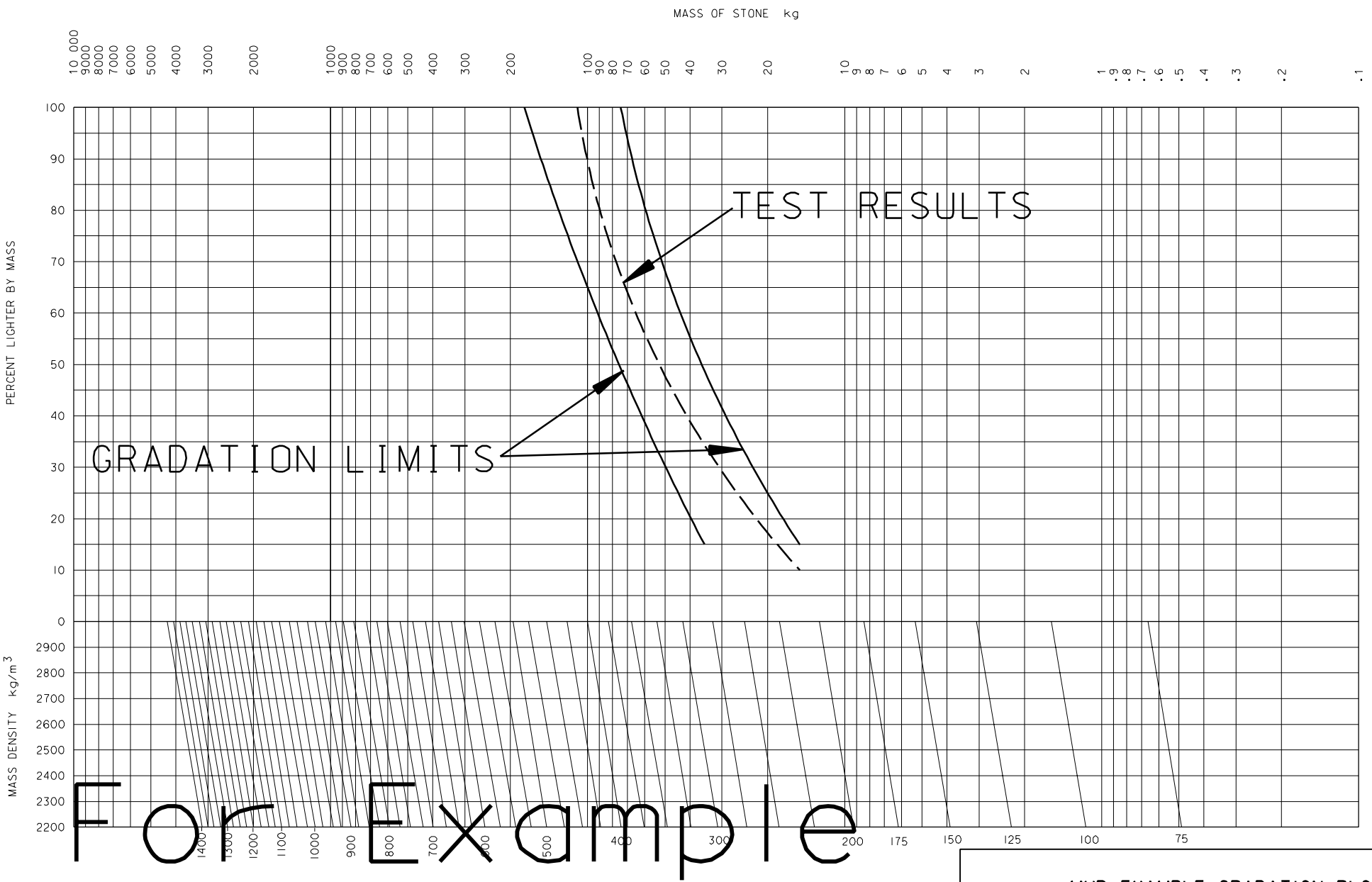
Remarks: _____

I certify that the above stone sample is representative of the total tonnage covered by this test report.

Contractor Representative _____

Government Representative _____

LMV FORM 602-R



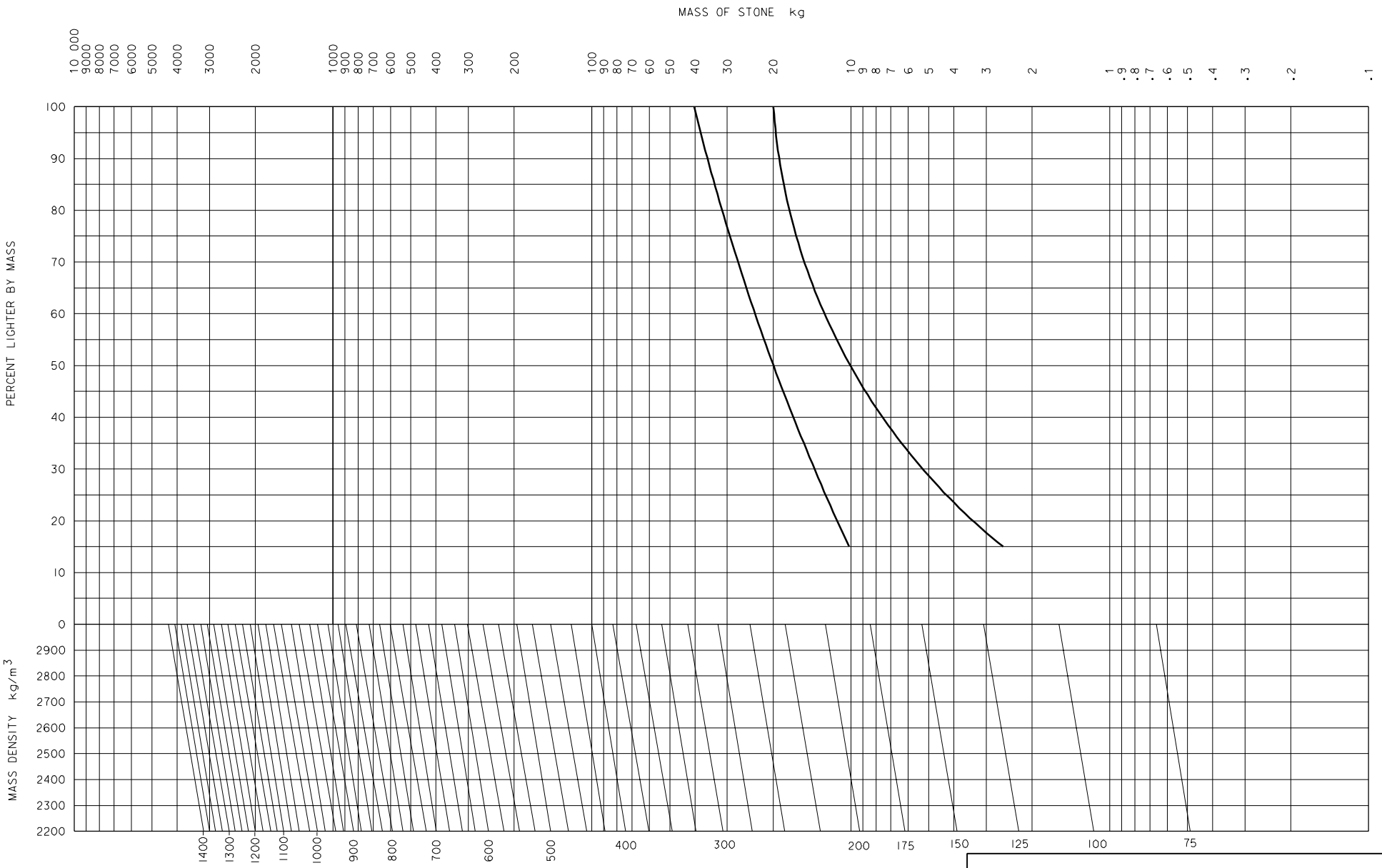
PROJECT MVD EXAMPLE GRADATION PLOT

AREA EXAMPLE ONLY

DATE _____ BY _____

RIPRAP GRADATION CURVES

ENG FORM 4794-RM, May 96



MASS DENSITY OF STONE _____ kg/m^3

"M40"

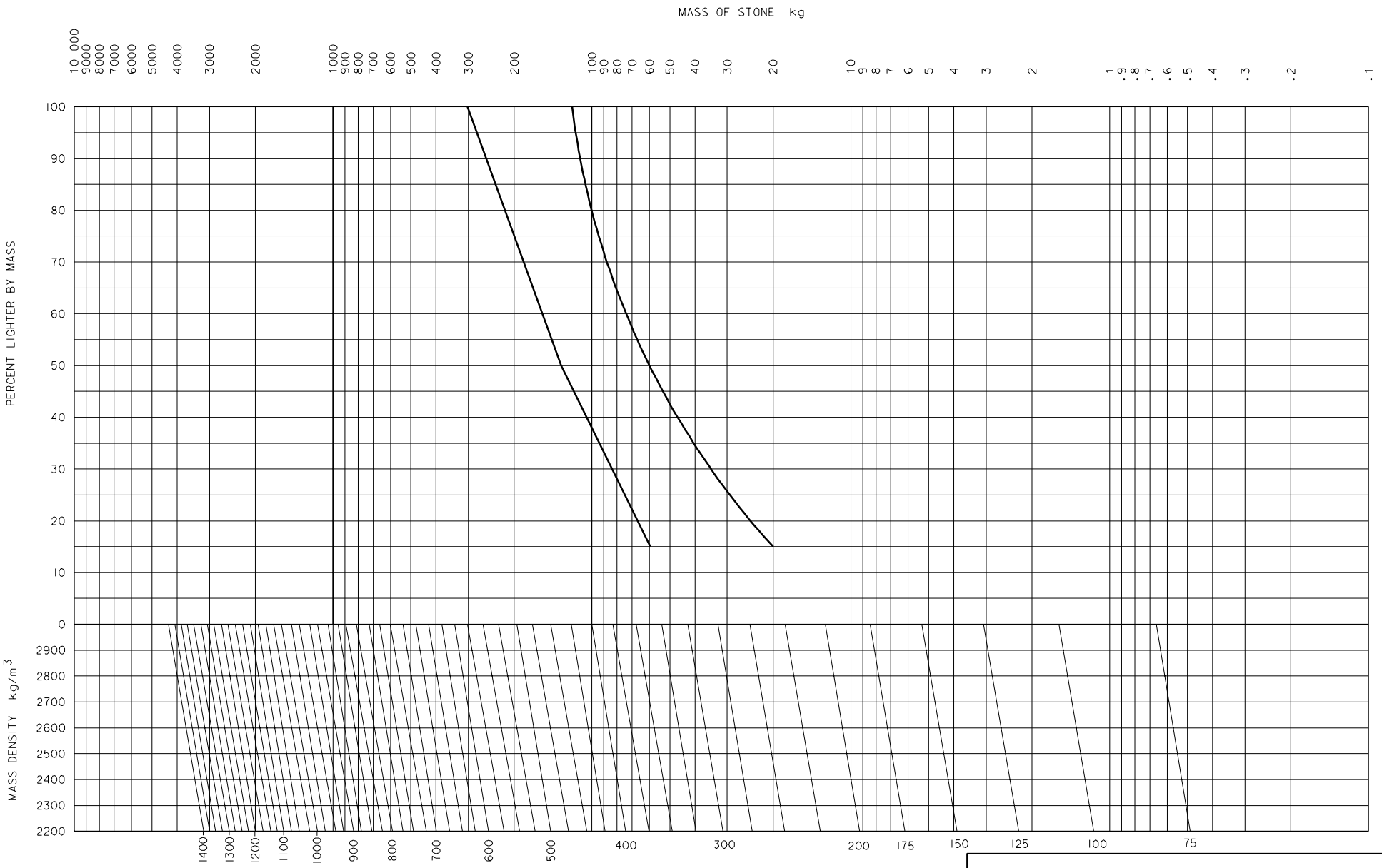
[R90]

PROJECT _____

AREA _____

DATE _____ BY _____

RIPRAP GRADATION CURVES



MASS DENSITY OF STONE _____ kg/m^3

"M300"

[R650]

PROJECT _____

AREA _____

DATE _____ BY _____

RIPRAP GRADATION CURVES

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02610

CORRUGATED STEEL SHEETING AND WALKWAY BRIDGE

PART 1 GENERAL

1.1 REFERENCES
1.2 SUBMITTALS

PART 2 PRODUCTS

2.1 CORRUGATED STEEL SHEETING
2.2 WALKWAY BRIDGE
2.2.1 Materials
2.2.1.1 Structural Steel
2.2.1.2 Concrete
2.2.2 Excavation and Backfill
2.2.3 Metalwork Fabrication and Erection
2.2.4 Security Fence

PART 3 EXECUTION

3.1 INSTALLATION
3.1.1 Corrugated Steel Sheeting
3.1.1.1 Gate Poles, Wire Rope(s) and Etcs.
3.1.2 Walkway Bridge

-- End of Section Table of Contents --

SECTION 02610

CORRUGATED STEEL SHEETING AND WALKWAY BRIDGE

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ASME INTERNATIONAL (ASME)

ASME B18.21.2M	(1994) Lock Washer (Metric Series)
ASME B18.22M	(1981, R 1990) Metric Plain Washers

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M	(1997a) Carbon Structural Steel
ASTM A 123	(1997a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 325M	(1997) High-Strength Bolts for Structural Steel Joints (Metric)
ASTM A 857/A 857M	(1997) Steel Sheet Piling, Cold Formed, Light Gage

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(1998) Structural Welding Code - Steel

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-13 Certificates

Corrugated Steel Sheeting; FIO.

The Contractor shall submit a statement signed by a responsible official of the manufacturer of the corrugated steel sheeting, attesting that the product meets specified requirements. The statement must be dated after the award of this contract, must name the project, and must list the specific requirements which are being certified.

PART 2 PRODUCTS

2.1 CORRUGATED STEEL SHEETING

Corrugated steel sheeting shall conform to the requirements of ASTM A 857/A 857M and shall be galvanized in accordance with ASTM A 123. The weight of the metal before corrugating shall be not less than 28.2 kilograms per square meter (10 gage). The corrugated steel sheeting shall be the interlocking type.

2.2 WALKWAY BRIDGE

2.2.1 Materials

2.2.1.1 Structural Steel

Structural steel shall meet applicable requirements of ASTM A 36/A 36M.

2.2.1.2 Concrete

Concrete and concrete work shall meet applicable provisions of Section 03307 CONCRETE.

2.2.2 Excavation and Backfill

Excavation and backfill for pier footings shall meet applicable requirements of Section 02226 EXCAVATION, FILL, AND BACKFILL FOR STRUCTURES.

2.2.3 Metalwork Fabrication and Erection

Finished members shall be free from kinks, bend, or winds. Shearing shall be accurately done, and all portions of the work neatly finished. All bolts, nuts, and screws shall be tight. Unless otherwise approved, welding shall be by the electric arc-welding process, using a method which excludes the atmosphere from the molten metal. Welding shall conform to the applicable provisions of the current AWS D1.1. Punching, drilling, reaming, and riveting shall be in accordance with the best commercial practice for the type of work concerned, and as approved. Bolts and nuts shall conform to the applicable provisions of ASTM A 325M for steel bolts and nuts of types shown. Plain washers shall meet requirements of ASME B18.22M, heavy series and lock washers shall meet requirements of ASME B18.21.2M, heavy series. Each walkway unit shall be assembled in the shop to determine the correctness of the fabrication and the matching of component parts. All steel parts of the walkway bridge, including bolts, nuts, and washers, shall be galvanized after fabrication in accordance with applicable details shown and each unit shall be accurately aligned so details shown, and each unit shall be accurately aligned so that no distortion of any-member occurs before it is finally in place. The alignment of all parts with respect to each other shall be true to the lines and elevations shown.

2.2.4 Security Fence

Security fence for walkway bridge shall be as specified in Section 02821 SECURITY FENCE and as shown on the drawings.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Corrugated Steel Sheeting

The corrugated steel sheeting shall be installed as indicted on the plans.

The sheeting may be driven using a hand maul, a light pneumatic hammer, or regular pile driving equipment. A driving head shall be used.

3.1.1.1 Gate Poles, Wire Rope(s) and Etcs.

See contract drawings for requirements.

3.1.2 Walkway Bridge

The walkway bridge and security fence and gate shall be installed as indicated. Walkway bridge and security fence and gate shall be grounded in accordance with Section 02821 SECURITY FENCE.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02707

LINED AND EMBEDDED CYLINDER CONCRETE PRESSURE PIPE

PART 1 GENERAL

1.1 REFERENCES
1.2 SUBMITTALS
1.3 DELIVERY AND STORAGE

PART 2 PRODUCTS

2.1 MATERIALS
2.1.1 Lined and Embedded Cylinder Concrete Pressure Pipe
2.1.2 Joint Lubricant
2.1.3 Steel Reinforcement
2.1.4 Joints
2.1.4.1 General
2.1.4.2 Joint Length
2.1.4.3 Limiting Angle
2.1.5 Gaskets
2.1.6 Joint Grout
2.1.7 Joint Mortar
2.2 BACKFILL
2.3 TESTS, INSPECTIONS, AND VERIFICATIONS

PART 3 EXECUTION

3.1 PREPARATION
3.1.1 Foundation
3.1.2 Foundation Shaping
3.1.3 Disposal
3.1.4 Shoring
3.2 INSTALLATION
3.2.1 Laying
3.2.2 Jointing
3.3 PRESSURE TESTING
3.4 PIPE DIAPHRAGM

-- End of Section Table of Contents --

SECTION 02707

LINED AND EMBEDDED CYLINDER CONCRETE PRESSURE PIPE

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 497M	(1997) Concrete Pipe, Manhole Sections, or Tile (Metric)
ASTM C 1107	(1997) Packaged Dry, Hydraulic-Cement Grout (Nonshrink)

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C301	(1992) Prestressed Concrete Pressure Pipe, Steel-Cylinder Type, for Water and Other Liquids

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Materials; GA.

Where materials are standard stock products of manufacturers, full descriptive data shall be submitted, including catalog cuts and specifications.

SD-04 Drawings

Shop Drawings; GA.

Before starting installation of any materials, the Contractor shall prepare and submit complete shop drawings of all work covered by this section, including installation details for the pipe, gaskets, joints and similar items requiring fabrication. These shop drawings shall include as a minimum the following drawings and catalog cuts:

a. Embedded cylinder concrete pressure pipe and fittings.

b. Layout of pipe and all pipe lengths used.

SD-09 Reports

Pressure Testing; GA.

The Contractor shall submit test results.

SD-13 Certificates

Lined and Embedded Cylinder Concrete Pressure Pipe; FIO.

The Contractor shall submit the pipe manufacturer's certified statement of the design strength of the pipe, consisting of:

a. The pipe manufacturer's certified statement of results of the hydrostatic tests required by the reference specification appropriate to the type of pipe furnished.

b. The pipe manufacturer's certified statement of current typical test reports on steel and steel wire reinforcing and compression tests of the concrete used in the manufacture of the pipe.

c. Such drawings and descriptions of the pipe joints as may be necessary to show that the joint conforms to the specified requirements.

1.3 DELIVERY AND STORAGE

All pipe sections and special fittings shall be marked by the manufacturer with the manufacturer's name or trademark, the date of manufacture, the nominal size, design head, design external load and the structure site for which it was designed and manufactured. All materials delivered and stored shall be handled and stored in such a manner that pipe, fittings and accessories are not damaged.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Lined and Embedded Cylinder Concrete Pressure Pipe

The pipe shall be the diameters shown on the drawings and shall conform to the requirements of AWWA C301. The outside diameter of the pipe and the minimum d factor strength are shown.

2.1.2 Joint Lubricant

Joint lubrication shall be as recommended by the pipe manufacturer.

2.1.3 Steel Reinforcement

The steel reinforcements shall conform to the requirements a AWWA C301 for the specified type of pipe, except that elliptical reinforcing cages or other reinforcements that require special orientation of the pipe during placement will not be allowed.

2.1.4 Joints

2.1.4.1 General

The pipe joints shall conform to the requirements of the applicable

specifications for the pipe. They shall be bell-and-spigot type and shall have a positive groove in the spigot to contain the rubber gasket. The size and shape of the groove shall be such that it will prevent displacement of the gasket by either internal or external water pressure when the joint is in any position within the required range of movement capability. Joint sleeves, also referred to as "collars" or "coupling bands", shall conform to the requirements for bell rings in the applicable pipe specifications. The joint shall be constructed so as to permit relative movement of the adjoining pipe sections with no reduction of water-tightness.

2.1.4.2 Joint Length

The joint length and the limiting angle defining the required capability of relative movement at each joint shall be no less than specified. Joint length refers to the permissible axial movement in the joint, and is defined as the maximum distance through which the spigot can move, relative to the bell or sleeve, from the fully engaged to the fully extended condition of the joint when the adjoining pipe sections are in parallel, concentric alignment. The joint is considered to be fully engaged when the spigot is inserted as far as it will go into the bell or sleeve, and fully extended when it is inserted the least amount that will insure full confinement of the gasket and complete water-tightness.

2.1.4.3 Limiting Angle

The limiting angle of the joint is the maximum deflection angle between adjoining pipe sections that the joints will permit before the outer surface of the spigot comes into direct contact with the inside of the mating bell or sleeve.

2.1.5 Gaskets

The pipe joint gaskets shall be endless rubber gaskets having a circular cross-sectional diameter conforming to the pipe manufacturer's recommendation for the type and size of pipe furnished.

2.1.6 Joint Grout

Grout for sealing the joints shall be applied as shown on the drawings and shall conform to the requirements of ASTM C 1107.

2.1.7 Joint Mortar

Mortar for interior joint protection shall be a mix of 1 part portland cement, 1 part sand and water (quantity) for proper consistency.

2.2 BACKFILL

Backfill shall be made with suitable materials to the lines and grade shown on the drawings and as specified for structure backfill in Section 02226 EXCAVATION, FILL, AND BACKFILL FOR STRUCTURES.

2.3 TESTS, INSPECTIONS, AND VERIFICATIONS

The concrete pressure pipe shall be tested, inspected and verified as meeting the requirements of ASTM C 497M. Tests will be waived upon acceptance of the manufacturer's certification that similar materials have been subjected to the required tests and that the materials furnished meet

the requirements specified.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Foundation

The Contractor shall perform excavation as indicated on the drawings and in accordance with Section 02226 EXCAVATION, FILL, AND BACKFILL FOR STRUCTURES. After completion of excavation and prior to installation of the pipe and any concrete placement, the excavation will be inspected by the Contracting Officer to ensure that suitable foundations or depths have been established.

3.1.2 Foundation Shaping

The bottom of the trench for the pipe shall be rounded to a depth 1/6 of the pipe diameter so that the lower portion of the pipe bears on firm material. Earthwork in the vicinity of the trench shall be performed so that the ground surface is properly pitched to prevent water running into the excavated area. Water which has accumulated in the excavated area shall be removed.

3.1.3 Disposal

Suitable excavated material shall be stockpiled to the maximum extent practicable and used for backfill. Unsuitable materials shall be disposed of as specified in Section 02226 EXCAVATION, FILL, AND BACKFILL FOR STRUCTURES, paragraph DISPOSAL OF EXCESS MATERIALS.

3.1.4 Shoring

In the event the Contractor elects to excavate in a vertical manner in lieu of the sloped excavation shown, the Contractor shall sheet and shore as required for the protection of the work and for the safety of personnel.

3.2 INSTALLATION

The pipe, with fittings, shall be installed at the locations indicated. The Contractor shall provide facilities and take measures to install pipe in the dry.

3.2.1 Laying

Except where authorized, pipe shall be laid with bells facing upstream. Before lowering and while suspended, the pipe shall be inspected for defects. Defective material shall be rejected. Pipe shall be laid in compliance with the manufacturer's instructions.

3.2.2 Jointing

The manufacturer's instructions shall be followed when lubricating and installing rubber gaskets. Joints shall comply with the manufacturer's instructions. The external annular space shall be filled with cement mortar or with a portland cement-filled polyurethane loop. The internal annular space shall be filled with cement mortar and struck off to insure a smooth and continuous surface between pipe sections.

3.3 PRESSURE TESTING

Pressure testing shall be performed prior to the placement of any concrete or earth fill around the conduit or filling of the pipe joints. The conduit shall be tested for leaks in the following manner: The ends of the conduits shall be plugged and a standpipe with a minimum diameter of 50 mm shall be attached to the upstream plug. The conduit shall be braced at each end to prevent slippage. The conduit and the standpipe shall be filled with water. The water level in the standpipe shall be maintained by continuous pumping a minimum of 3 m above the invert of the upstream end of the conduit for a period of not less than two hours. The pipe joints shall show no leakage. Any leaks that occur during this period shall be repaired by a method satisfactory to the Contracting Officer. After repair, the conduit shall be tested again as described above and the procedure shall be repeated until the conduit is accepted as watertight.

3.4 PIPE DIAPHRAGM

A pipe diaphragm shall be constructed around the lined and embedded cylinder concrete pressure pipes at the location and to the dimensions shown on the drawings. The concrete shall conform to Section 03307 CONCRETE.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02714

DEWATERING

PART 1 GENERAL

1.1 DEFINITIONS
1.1.1 Protected Area
1.1.2 Dewatering
1.1.3 Dewatering System
1.1.4 Flooding
1.1.5 Unwatering
1.1.6 Rewatering
1.2 SUBMITTALS
1.3 GENERAL
1.3.1 Permanent Work Under This Contract
1.3.2 Design Requirements

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 SYSTEM REQUIREMENTS
3.2 INITIAL TESTING
3.3 REVIEW OF SYSTEM DESIGN AND PERFORMANCE
3.4 OPERATION
3.5 MAINTENANCE AND SERVICING
3.6 REMOVAL

-- End of Section Table of Contents --

SECTION 02714

DEWATERING

PART 1 GENERAL

1.1 DEFINITIONS

1.1.1 Protected Area

Protected area is defined as the area required to be excavated in order to construct the drainage structure, Item 1D, Station 0+560.97.

1.1.2 Dewatering

Dewatering is defined as the lowering of the ground water below the slopes and bottom of the excavation to ensure dry, firm working conditions and the reduction to safe levels of any hydrostatic uplift pressures in any confined foundation strata or aquifers which is necessary to ensure the stability and integrity of the foundation.

1.1.3 Dewatering System

Dewatering system is defined as the machinery, equipment, and appurtenances necessary for and related to the accomplishment of dewatering, and the collection and disposal of all surface water within the protected area.

1.1.4 Flooding

Flooding of the excavation is defined as the controlled process of filling the excavation with water to a specified elevation and at a specified rate.

1.1.5 Unwatering

Unwatering is defined as the process of removing all water within an excavation.

1.1.6 Rewatering

Rewatering is defined as the controlled process of placing water in the completed structure and/or excavation to its natural occurring elevation at a specified rate when the construction is completed and the dewatering system is no longer required.

1.2 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-08 Statements

System Description; GA.

The Contractor shall submit details of his proposed dewatering facilities

for review and approval.

SD-09 Reports

Initial Testing; FIO.

The Contractor shall initially test and evaluate the installed dewatering system and furnish results to the Government.

1.3 GENERAL

The work consists of designing, furnishing, installing, and operating a system to dewater the excavation, excavation slopes, foundation surfaces, and other protected areas where work is to be performed, maintaining these areas free from water during construction operations, monitoring the ground water and piezometric levels, rewatering the area under controlled conditions at the termination of the dewatering, having the capability for emergency flooding, and removing the system. The Contractor or sub-contractor installing and removing the well systems shall be licensed by the State of Louisiana in accordance with Louisiana Water Wells Rules, Regulations, and Standards (Nov 1985).

1.3.1 Permanent Work Under This Contract

All permanent work under this contract except as otherwise specified shall be carried on in areas free of water. The Contractor shall design, furnish, install, operate, and maintain such facilities necessary to accomplish the following:

a. Collect and dispose of all surface water in the protected area regardless of source.

b. Control and dispose of all surface water around the periphery of the excavation areas to prevent such water from entering the excavation.

c. Lower and maintain the water table at a level to ensure dry firm working conditions.

d. Install construction piezometers and monitor the phreatic surface and piezometric levels.

e. Relieve excess hydrostatic pressures in the pervious sand stratum existing between approximately elevations -6.0 meters and -24.2 meters to prevent upheaval of, or any form of damage to, the foundation.

f. Provide a system of dikes or ditches around the periphery of the excavation to route water away from the side slopes.

1.3.2 Design Requirements

The dewatering system shall be designed using accepted professional methods of engineering design consistent with the best current practice. The Contractor shall perform necessary tests and/or analyses of the ground-water quality and soil environment at the site to satisfy himself that materials used in his system will not corrode or otherwise deteriorate to such an extent that the system will not perform satisfactorily during the life of the contract, and that adequate preventative and/or maintenance procedures are incorporated in his dewatering system design to prevent the clogging of the system due to the buildup of incrustation resulting from

the deposition of dissolved minerals in the ground water and slime-forming organisms. Piezometers shall be as indicated in paragraph SYSTEM REQUIREMENTS, subparagraph i.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 SYSTEM REQUIREMENTS

The dewatering system shall be of a type and capacity to accomplish all requirements specified.

a. The dewatering system shall be designed, installed, and operated to dewater the excavation for Tensas River stages at the drainage structure, Item 1D, Station 0+560.97, up to and including elevation 16.0 meters N.G.V.D.

b. The system shall be of such capacity that it will lower and maintain the free-water and piezometric levels to ensure dry, firm working conditions and to prevent upheaval of, or any form of damage to the foundation. The system shall have sufficient capacity to accomplish this desired result allowing for normal variations in soil properties and foundation conditions.

c. The water level shall be maintained continuously at or below the elevations specified above so that construction operations can be performed without interruption due to wet conditions.

d. No upward or vertical or lateral flow of ground water into the work area will be permitted at any time. The dewatering system shall be designed, constructed, and operated at all times, including unwatering, rewatering, and/or flooding so as to prevent movement and/or piping of the foundation, excavation slopes, and fill materials. The system shall be operated as necessary during dewatering, unwatering, flooding, and rewatering so as to maintain piezometric levels, within the dewatered area, at or beneath the elevation of the water level in the excavation.

e. The system shall consist of wells, and/or wellpoints, pumps, sumps, sump pumps, ditches, and necessary appurtenances capable, at all river or bayou stages less than or equal to the design stage defined in paragraph "a" above, of intercepting seepage before it exits on any interior surface or excavation face and of providing control of surface water. The system shall be operated as required in paragraph "c" above to prevent flooding filter materials and fresh concrete; and shall be designed to control a rainfall intensity of 165 mm per hour in 24 hours and/or 62.5 mm per hour. Protection of all slopes will be required to prevent erosion under normal surface runoff and construction conditions.

f. Initial unwatering of an excavation need not be accomplished by sumping alone, but may utilize sumping in addition to positive dewatering accomplished with a system meeting the requirements of paragraph "d" above. Initial unwatering shall at all times fulfill the requirements of paragraph "d" above.

g. Rewatering and/or flooding of the area shall be accomplished by directing surface and ground water into the area. The dewatering system shall be kept operating at full capacity during such conditions,

with dewatering effluent being directed into the excavation. Protection of slopes and excavation surfaces shall be provided as necessary to prevent erosion during flooding operations. No upward or vertical or lateral flow of ground water into the excavation will be permitted.

h. Burying of headers will be allowed only in areas and to depths absolutely necessary for protection against damage at construction equipment crossings.

i. A system of construction piezometers will be required to monitor free water-surface elevations and piezometric elevations to evaluate the effectiveness of the dewatering system in fulfilling the requirements specified. The piezometer shall be of adequate numbers and in suitable arrangements and depths for determining the free water surface elevation and piezometric elevation over the area. The Contractor shall make a minimum of two readings per piezometer, per 24 hour period, a minimum of 9 hours apart, based on a seven day week. Once the water level has stabilized following initial drawdown, the Contracting Officer may direct the Contractor to take one reading per day. These piezometer readings, along with corresponding river and bayou stage readings, shall be recorded on an approved form and reported to the Contracting Officer within 12 hours after they are obtained. If, in the opinion of the Contracting Officer, more frequent readings are required, the Contractor will be directed as to the number and time that these readings are required. If additional readings are directed, an equitable adjustment will be made in accordance with the Contract Clause CHANGES.

j. The system shall include mechanical means, such as an in-line venturi meter for measuring the effluent from each wellpoint segment and/or each well as well as the total effluent of the dewatering system. Devices and techniques used in measurement shall be acceptable to the Contracting Officer. Initially, the Contractor shall make a minimum of two readings per instrument, per 24 hour period, a minimum of 9 hours apart, based on a seven day week. After the effluent reaches a constant flow and upon approval, minimum of one reading per day will be required. These instrument readings, along with corresponding river and bayou stage readings, shall be recorded on an approved form and reported to the Contracting Officer within 12 hours after they are obtained. If, in the opinion of the Contracting Officer, more frequent readings are required, the Contractor will be directed as to the number and time that these readings are required. If additional readings are directed, an equitable adjustment will be made in accordance with the Contract Clause CHANGES.

k. The system shall be designed, installed, and operated in a manner which will preclude removal of materials from the foundation by the pumping operation (hereafter referred to as "sanding"). After installation, each well or wellpoint segment shall be individually pump-tested at maximum design flow to verify acceptability with respect to sanding. The dewatering system shall be designed and constructed so as to permit periodic measuring of sanding characteristics of each well and/or wellpoint segment. Any well or wellpoint segment found sanding at a rate exceeding 0.5 liters per 95,000 liters of effluent at any time during this contract shall be replaced in a manner acceptable to the Contracting Officer, and at no additional cost to the Government.

l. The rate of unwatering the excavation shall not exceed 2 days for

the first 3 m and 0.3 m per day thereafter until completely unwatered.

m. The maximum rate of rise in flooding or rewatering the excavation shall be 300 mm per day. Provisions and requirements for emergency flooding are given in paragraph OPERATION.

n. The system shall be designed and have provisions for the operation of standby equipment for emergency use to maintain the water level continuously at or below the elevations specified above.

3.2 INITIAL TESTING

Upon installation of the system, the Contractor shall test and evaluate the completed system to demonstrate to the satisfaction of the Contracting Officer that the system is, in fact, capable of performing the intended dewatering operation as outlined. All test results and installation reports shall be recorded by the Contractor in full detail and copies furnished the Government.

3.3 REVIEW OF SYSTEM DESIGN AND PERFORMANCE

The Contractor shall submit to the Contracting Officer, for review and approval, details of his proposed dewatering facilities, including the type of system, planned layout and sizes of wells and/or well points, including screen diameter, lengths, and screen open areas, headers, including all lengths requiring burial, collectors, ditches, piezometers, sumps and pumps; capacities of standby pumping and power supply facilities; number, type, location, proposed method of installation, and proposed methods of testing of piezometers; facilities for measuring the flow of water pumped from each well and/or wellpoint segment of the dewatering system; facilities and proposed schedule for monitoring of sanding; provisions for disposal of water from the dewatering system; provisions for handling and disposal of surface water; and plan of operation including flooding and rewatering plans. This submittal shall include the design capacity of each well and/or wellpoint segment at the design stage, and shall be submitted no later than 60 days prior to installation of the system. The Contracting Officer's review of the Contractor's proposed dewatering facilities will be for the purpose of determining:

a. the acceptability of the general design concept and layout of the system;

b. the gross capacity of the system at the design stage; and

c. the acceptability of the flooding and rewatering plans.

The design and installation procedure of the individual components of the system need not be submitted for review as the performance of the complete system remains a responsibility of the Contractor. If the Contracting Officer determines, based on the above mentioned review, that the system appears adequate to accomplish the required results, the system will be approved for installation. If the Contracting Officer's review determines that the Contractor's proposed dewatering facilities are either inadequate or inappropriate to accomplish the required results, the Contractor will be so notified in writing, and the basis for rejection will be included. Subsequent approval of the dewatering plan for installation, either as submitted or revised as a result of the review, should not be interpreted as the Government accepting responsibility for the performance of the dewatering system and shall not relieve the Contractor of full

responsibility for the proper design, installation, maintenance, operation, and actual performance of both the individual system components and the entire system. After approval for installation, the Contractor shall install the entire dewatering system and shall make no reduction to the planned system without the prior written approval. If, during the progress of the work, the installed dewatering system proves inadequate to meet the requirements specified, including piezometers, the Contractor shall, at his expense, furnish, install, and operate such additional dewatering facilities and/or make such changes, either in features of the system or the plan of operation, as may be necessary to perform the required dewatering in a satisfactory manner. Such changes and additions shall be approved in writing prior to being made.

3.4 OPERATION

The Contractor will be required to perform such dewatering and to maintain the work areas in a dry condition as long as is necessary for the work under this contract. Once an area is dewatered, it shall be maintained in a dewatered condition until all work in that area is completed, unless flooding is directed or approved. In the event that flooding is deemed necessary, the protected area shall be flooded in accordance with the sequence of flooding proposed by the Contractor and approved. However, the Contractor shall not flood the protected areas without approval. If flooding is directed, based on a predicted river or bayou stage which would exceed the specified maximum design stage of the dewatering system, the Contractor will be compensated for damages to permanent work in accordance with Section 01000 GENERAL CONTRACT REQUIREMENTS, paragraph DAMAGE TO WORK. If flooding is necessitated because of the Contractor's fault, negligence, or convenience, all costs resulting from such flooding will be borne by the Contractor. If flooding is directed for reasons other than those above, all extra costs will be borne by the Government and the contract will be modified pursuant to Contract Clause CHANGES. Commencement of dewatering subsequent to flooding shall be subject to prior approval.

3.5 MAINTENANCE AND SERVICING

The Contractor shall be responsible for the maintenance, servicing, and repairs of the entire dewatering system and appurtenances during the life of the contract, including replacement of any and all wells, wellpoints, piezometers found performing unsatisfactorily.

3.6 REMOVAL

The dewatering facilities required to maintain a dry condition within the protected area shall be maintained until completion of the work within the protected area, and then shall be completely removed. However, no dewatering facilities of any kind shall be removed without prior approval. All wells, wellpoints, pumps, and appurtenances employed in the dewatering system and all materials other than earth shall remain the property of the Contractor and shall be removed by him from the site of the work. All grouting of these facilities shall conform to Chapter III of the Louisiana Water Wells Rules, Regulations, and Standards (Nov 1985) and in particular Section 3.2.5.0. P and A forms are required on these systems.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02719

CORRUGATED METAL PIPE

PART 1 GENERAL

1.1 REFERENCES
1.2 GENERAL
1.3 SUBMITTALS

PART 2 PRODUCTS

2.1 MATERIALS
2.1.1 Corrugated Metal Pipe
2.1.1.1 Pipe Ends
2.1.1.2 Lifting Lugs
2.1.1.3 Pipe Gage
2.1.1.4 Pipe Lengths
2.1.2 Connecting Bands
2.1.2.1 Pipe All Sizes
2.1.2.2 Tank Rods
2.1.2.3 Bands
2.1.3 Test Reports and Bills of Lading
2.1.4 Bituminous Coating

PART 3 EXECUTION

3.1 INSTALLATION
3.1.1 Pipe
3.1.2 Connecting Bands
3.1.3 Touch-up
3.2 PIPE TRENCH EXCAVATION
3.2.1 General
3.2.2 Disposition of Materials
3.2.2.1 Suitable Materials
3.2.2.2 Excess and Unsuitable Materials
3.3 PLACING OF PIPES
3.4 BACKFILL FOR PIPES
3.4.1 General
3.4.2 Compaction

-- End of Section Table of Contents --

SECTION 02719

CORRUGATED METAL PIPE

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 123/A 123M	(1997a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 760/A 760M	(1997) Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
ASTM A 780	(1993a) Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM A 849	(1997) Post-Applied Coatings, Pavings, and Linings for Corrugated Steel Sewer and Drainage Pipe
ASTM D 698	(1991; R 1998) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))
ASTM D 1056	(1998) Flexible Cellular Materials - Sponge or Expanded Rubber
ASTM D 2487	(1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(1998) Structural Welding Code - Steel

1.2 GENERAL

The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding to or on corrugated metal pipe shall be in accordance with the applicable provisions of AWS D1.1, except that the limitations on types of base metal shall not apply where other types are specified or shown.

1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-13 Certificates

Corrugated Metal Pipe; FIO.

Certificates of compliance shall be submitted attesting that the materials meet the specified requirements.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Corrugated Metal Pipe

The pipe shall be corrugated steel pipe in accordance with ASTM A 760/A 760M, zinc-coated, fully bituminous coated, Type I, with helical corrugations and folded lock seams. Sizes shall be as shown on the drawings. The lock seams shall be welded at each end of the pipe section. Corrugations shall be either 68 by 13 mm (nominal size) or 75 by 25 mm (nominal size). If ASTM A 760/A 760M (metric diameters) pipe is not locally available, then (inch diameters) pipe may be furnished as specified herein.

2.1.1.1 Pipe Ends

Pipe shall have the ends equipped with a minimum of four (4) rerolled annular corrugations.

2.1.1.2 Lifting Lugs

All pipe shall be equipped with two (2) lifting lugs. These lugs shall be attached to the pipe by welding.

2.1.1.3 Pipe Gage

The pipe shall be 12 gage.

2.1.1.4 Pipe Lengths

The Contractor may elect to furnish pipe section lengths in combinations that will reduce the number of connecting bands. Pipe section lengths shall be approved.

2.1.2 Connecting Bands

2.1.2.1 Pipe All Sizes

The following described connecting bands shall be used. They shall have a minimum of nine (9) corrugations (68 by 13 mm corrugations) or seven (7) corrugations (75 by 25 mm corrugations) and a minimum circumferential lap of 150 mm. The band shall be rolled so that when it is placed on the pipe sections, the ends of the pipe will fit flush. The binders for the connecting band shall consist of a minimum of six (6) rods and tank lugs in accordance with the details shown. A closed cell expanded rubber gasket shall be used with this type connecting band. The closed cell gasket shall be 300 mm wide, 9.5 mm thick,unstretched diameter 10 percent less than the

normal pipe size and shall comply with ASTM D 1056, Grade SCE-43. The gasket shall be centered over the pipe joint under the connecting band.

2.1.2.2 Tank Rods

The tank rods shall be 12 mm in diameter and shall be equipped with 12 mm diameter rolled threads. The nuts used on the rods shall be 12 mm x 100 mm steel hexagon head coupling nuts galvanized and retapped 0.5 mm (0.8 mm maximum) oversized to remove excess galvanizing from threads. Tank rods, nuts and washers shall be galvanized in accordance with ASTM A 123/A 123M. If metric sized products are not locally available, the following may be substituted. The tank rods shall be 7/16-inch in diameter and shall be equipped with 1/2-inch x 1 3/4-inch steel hexagon head coupling nuts galvanized and retapped 0.020-inch (1/32-inch maximum) oversized to remove excess galvanizing from threads.

2.1.2.3 Bands

The bands shall have the same coating, depth of corrugation and gage as specified for the pipe.

2.1.3 Test Reports and Bills of Lading

A metallurgical test report and bill of lading showing respective heat numbers shall be furnished for all pipe delivered to the job.

2.1.4 Bituminous Coating

The bituminous coating for touch-up shall meet the requirement of ASTM A 849.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Pipe

When delivered to the job site, the pipe shall be unloaded from the truck in a manner that will ensure no damage to the coatings or bending of the pipe. The pipe shall be unloaded by use of hoist, skids and snubbing ropes or other methods approved. Under no circumstances shall the pipe be allowed to drop from the truck or roll freely. Lifting of the pipe shall be done by use of slings or lifting lugs attached to the pipe. The use of hooks attached to the ends of the pipe will not be allowed. Areas of pipe that will come in contact with concrete shall be coated with bituminous paint prior to placing concrete around the pipe.

3.1.2 Connecting Bands

The connecting bands shall be installed as shown. The closed cell gasket shall be centered over the pipe joint under the connecting band.

3.1.3 Touch-up

All welds and exposed metal shall be repaired in accordance with ASTM A 780, painted with two coats of zinc dust-zinc oxide primer as recommended by the pipe manufacturer, and coated with an approved bituminous coating to a thickness at least equal to the pipe coating.

3.2 PIPE TRENCH EXCAVATION

3.2.1 General

The pipe trench excavation shall consist of removal of material in preparing the foundation to the lines and grades shown and removal of unsuitable materials. The surfaces upon which pipe is to be placed shall be accurately finished to the lines and grades required. All foundations shall be on solid, undisturbed or properly compacted material. When disturbed by the Contractor's operations, and elsewhere as required, the excavated surfaces shall be moistened with water if necessary and tamped or rolled with suitable tools or equipment for the purpose of thoroughly compacting them and forming firm foundations upon or against which to place the pipes. Wherever unsuitable foundation material is encountered, the unsuitable material shall be removed to the depth directed. Over excavation will not be permitted except to remove unsuitable material as directed. If at any point in the excavation for pipes, material is excavated beyond the excavation lines shown, such unauthorized overexcavation shall be backfilled and compacted as specified for structure backfill in Section 02226 EXCAVATION, FILL AND BACKFILL FOR STRUCTURES, paragraph STRUCTURE BACKFILL, at no additional cost to the Government. If at any point in excavation the foundation material is found to be unsuitable, it shall be removed as directed and replaced with selected materials placed and compacted as specified above and an equitable adjustment in contract price and time will be made in accordance with the Contract Clause CHANGES. Excavated materials shall be disposed of as specified in paragraph EXCESS AND UNSUITABLE MATERIALS. All excavation and foundation preparation shall be performed in areas free of water. Where dimensions of pipe trenches are not shown, the bottom width shall be not less than 600 mm greater than the outside span dimension of the pipe. Excavation for pipes shall fit the outside periphery of the bottom quadrant of the pipe. If required, cross-trenches shall be excavated to receive the hubs of pipe, and to prevent non-uniform load at joints.

3.2.2 Disposition of Materials

3.2.2.1 Suitable Materials

Excavated materials which are suitable for incorporation in the fill or backfill shall either be placed directly or stockpiled and subsequently used in the fill or backfill. Suitable materials shall be clay CL, CH, or silt ML in accordance with ASTM D 2487. Stockpiled material shall be placed no closer than 15 meters from the top bank or pipe excavation. Such stockpiled material shall have a maximum height not to exceed 3 meters, shall be placed so as to drain, and shall have end and/or side slopes not steeper than 1V on 2H.

3.2.2.2 Excess and Unsuitable Materials

All excess excavated material and unsuitable material shall be disposed of by placing it in excavated portions of the borrow areas.

3.3 PLACING OF PIPES

Corrugated metal pipe shall be laid with separate sections jointed firmly together and with outside laps of circumferential joints pointing upstream and with longitudinal laps on the sides. The coupling bands shall lap at equal portion on each pipe section jointed and shall be drawn tight to ensure that the corrugations fit snugly and provide a satisfactory joint. The pipe shall be placed with the pipe invert coinciding with the specified

grade lines. Pipe shall be handled with care so that the coating will not be damaged. Proper facilities shall be provided for lowering the pipe into the trench. Damaged areas on coupling bands, pipe and bolts and angles shall be coated with an approved asphaltic cement prior to placing backfill except that exposed metal in joints shall be coated prior to making joints.

3.4 BACKFILL FOR PIPES

3.4.1 General

Backfill around the corrugated metal pipe shall be hand compacted (tamped) from the circumference of the pipe to a distance of at least 300 mm from the pipe. The fill material to be hand compacted shall be placed in layers not exceeding 100 mm in thickness and shall be compacted by application of a motor driven hand tamper or other approved hand compaction equipment over the fill in such a manner that every point of the surface of each layer of fill will be compacted by the hand tamper. The pipe conduit shall be held securely in place at all times while tamping is being performed to ensure proper bond between the pipe and the ground. Compaction of subsequent lifts shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment well suited to the type of material being compacted. No fill shall be placed against slopes steeper than one (1) horizontal to one (1) vertical unless approved.

3.4.2 Compaction

Pipe backfill placed as describe above shall be compacted at optimum moisture (plus or minus 2 percent) to within 95 percent of maximum density. Optimum moisture and maximum density shall be determined by the Contractor in accordance with ASTM D 698 (Standard Proctor) from representative samples of each type of material to be placed. Test results shall be furnished to the Contracting Officer before placing pipe backfill. Field density and moisture content tests shall be determined by the Contractor in accordance with ASTM D 2922 (Nuclear Probe) on each lift placed. The Contractor shall furnish control tests and reports daily in accordance with Section 01451 CONTRACTOR QUALITY CONTROL.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02821

SECURITY FENCE

PART 1 GENERAL

1.1 REFERENCES
1.2 SUBMITTALS

PART 2 PRODUCTS

2.1 FENCE FABRIC
2.2 GATES
2.3 POSTS AND RAILS
2.4 ACCESSORIES
2.5 PADLOCKS

PART 3 EXECUTION

3.1 INSTALLATION
3.2 POST INSTALLATION
3.3 BRACES AND TRUSS RODS
3.4 CHAIN LINK FABRIC
3.5 BARBED WIRE SUPPORTING ARMS AND BARBED WIRE
3.6 GATE INSTALLATION
3.7 GROUNDING

-- End of Section Table of Contents --

SECTION 02821

SECURITY FENCE

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 121	(1992a) Zinc-Coated (Galvanized) Steel Barbed Wire
ASTM A 153/A 153M	(1995) Zinc-Coated (Hot Dip) on Iron and Steel Hardware
ASTM A 392	(1996) Zinc-Coated Steel Chain-Link Fence Fabric
ASTM A 780	(1993a) Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM F 626	(1996) Fence Fittings
ASTM F 883	(1990) Padlocks
ASTM F 900	(1994) Industrial and Commercial Swing Gates
ASTM F 1083	(1997) Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-13 Certificates

Chain Link Fence; GA.

Statement, signed by an official authorized to certify on behalf of the manufacturer, attesting that the chain link fence and component materials meet the specified requirements.

PART 2 PRODUCTS

2.1 FENCE FABRIC

ASTM A 392, Class 2, zinc coated steel wire with minimum coating weight of 610 grams of zinc per square meter of coated surface. Fabric shall be fabricated of 9 gauge wire woven in 50 mm mesh, and knuckled at both selvages. Fabric height shall be as shown.

2.2 GATES

ASTM F 900. Gate shall be the type and swing shown. Gate frames shall conform to strength and coating requirements of ASTM F 1083 for zinc-coated, inside and outside by hot-dip process, steel pipe, weight and size as shown. Gate fabric shall be as specified for chain link fabric in accordance to paragraph FENCE FABRIC. Gate leaves shall have diagonal truss rods or shall have tubular members as necessary to provide rigid construction, free from sag or twist. Gate fabric shall be attached to the gate frame by method standard with the manufacturer except that welding will not be permitted. Latches, hinges, stop, keepers, and other hardware items shall be furnished as required for the operation of the gate. Latches shall be arranged for padlocking so that the padlock will be accessible from both sides of the gate. Stop shall be provided for holding the gates in the open position.

2.3 POSTS AND RAILS

ASTM F 1083, zinc-coated, inside and outside by hot-dip process, steel pipe, weight and size as shown.

2.4 ACCESSORIES

ASTM F 626. Ferrous accessories shall be zinc-coated. Truss rods shall be provided with turnbuckles or other equivalent provisions for adjustment. Barbed wire shall be 2 strand, 12 gauge wire, zinc-coated, Class 3 in accordance with ASTM A 121. Barbed wire shall be four-point barbed type steel wire. Barbed wire support arms shall be the V arm type and of the design required for the post furnished. Tie wire for attaching fabric to rails, braces, and posts shall be aluminum and match the coating of the fence fabric. Miscellaneous hardware coatings shall conform to ASTM A 153/A 153M unless modified.

2.5 PADLOCKS

The Contractor shall furnish two padlocks meeting ASTM F 883, Type PO1, Grade 2 EPB, Size 44 mm (1-3/4 inch). Padlocks shall be keyed alike and each lock shall be furnished with four keys.

PART 3 EXECUTION

3.1 INSTALLATION

Fence shall be constructed in accordance with the details shown on the drawings. Fabric shall be installed on the landside of the posts. Any damage to galvanized surfaces, including welding, shall be repaired with paint containing zinc dust in accordance with ASTM A 780.

3.2 POST INSTALLATION

Posts shall be plumb and in alignment, as indicated.

3.3 BRACES AND TRUSS RODS

Braces and truss rods shall be installed as indicated.

3.4 CHAIN LINK FABRIC

Fabric shall be attached to terminal posts with stretcher bars and tension bands. Bands shall be spaced at approximately 381 mm (15 inch) intervals. The fabric shall be installed and pulled taut to provide a smooth and uniform appearance free from sag, without permanently distorting the fabric diamond or reducing the fabric height. Fabric shall be fastened to line posts at approximately 381 mm (15 inch) intervals and fastened to all rails and tension wires at approximately 305 mm intervals. Fabric shall be cut by untwisting and removing pickets.

3.5 BARBED WIRE SUPPORTING ARMS AND BARBED WIRE

Barbed wire supporting arms and barbed wire shall be installed as indicated on the drawings. Supporting arms shall be welded as shown. Barbed wire shall be pulled taut and attached to the arms with clips or other means that will prevent easy removal.

3.6 GATE INSTALLATION

Gates shall be installed as shown. Hinged gates shall be mounted to swing as indicated. Latches, stop, and keepers shall be installed as required. Padlocks shall be attached to gates or gate posts with chains. Hinge pins, and hardware shall be welded or otherwise secured to prevent removal.

3.7 GROUNDING

Fence and gate shall be grounded. Ground shall be be connected to the ground rod by exothermic weld. Ground wire shall be connected to fence and gate with screw type ground clamps. Ground rod shall be 20 mm by 3 m copperweld rod.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02933

NEW TURF ESTABLISHMENT

PART 1 GENERAL

1.1 AREAS REQUIRING NEW TURF ESTABLISHMENT
1.2 COMMENCEMENT REQUIREMENTS
1.2.1 New Turf Establishment
1.3 MINIMUM SPECIFIED QUANTITIES AND PROCEDURES
1.4 HERBICIDE USE
1.4.1 Herbicide Application Plan
1.4.2 Acceptance of Plan and Proposed Changes
1.5 GRAZING
1.6 HAY HARVESTING
1.7 SUBMITTALS

PART 2 PRODUCTS

2.1 FERTILIZER
2.2 HERBICIDES
2.2.1 Herbicide Application
2.2.2 Application Reporting
2.3 LIME
2.4 MULCH
2.5 BERMUDA GRASS SPRIGS AND/OR SEEDS
2.5.1 Selection Criteria
2.5.2 Bermuda Grass Sprigs
2.5.3 Bermuda Grass Seed
2.6 WATER

PART 3 EXECUTION

3.1 NEW TURF ESTABLISHMENT
3.1.1 General
3.1.2 Soil Testing
3.1.3 Advance Notification Requirements
3.1.4 Vegetation Removal
3.1.5 Preplanting Embankment Restoration
3.1.6 Soil Preparation
3.1.7 Preplanting Lime Application
3.1.8 Preplanting Fertilizer Application
3.1.9 Planting Options
3.1.9.1 Sprigging
3.1.9.2 Seeding
3.1.10 Mulching
3.1.11 Inspections and Reports
3.1.12 Replanting
3.1.13 Postplanting Fertilizer Application
3.1.14 New Turf Maintenance

3.1.15 Additional Fertilizer Requirements During First Growing Season
3.1.16 Requirements During Subsequent Growing Seasons
3.1.17 Coordination Meeting
3.1.18 Establishment
3.1.19 Inspection and Acceptance

-- End of Section Table of Contents --

SECTION 02933

NEW TURF ESTABLISHMENT

PART 1 GENERAL

1.1 AREAS REQUIRING NEW TURF ESTABLISHMENT

Turf shall be established on all levee embankment, ramps, road crossings, and structure embankment constructed under this contract and the 1.5 m wide strips contiguous thereto. All other disturbed areas, except borrow areas and areas to receive other types of surfacing, shall receive erosion control in accordance with Section 02960 EROSION CONTROL.

1.2 COMMENCEMENT REQUIREMENTS

1.2.1 New Turf Establishment

The Contractor shall begin new turf establishment on each reach of levee embankment that is accepted as soon as practicable, but within the specified planting period.

1.3 MINIMUM SPECIFIED QUANTITIES AND PROCEDURES

All requirements identified as minimum requirements are fully compensated under the payment item "Turfing". The Contractor may exceed minimum specified requirements in an effort to reduce establishment periods and associated costs, at no additional cost to the Government.

1.4 HERBICIDE USE

1.4.1 Herbicide Application Plan

Approved herbicides may be used on areas requiring new turf establishment. At least 30 days prior to application of any herbicide, the Contractor shall furnish a herbicide application plan for review by the Contracting Officer. The Contractor shall ensure that the plan for herbicide applications complies with all applicable local, state, and federal requirements. The plan shall include, as a minimum, proposed herbicides and application rates, copies of herbicide manufacturer's labels and material safety data sheets, any state-imposed conditions, copies of commercial and/or restricted use herbicide applicators' certificates from the states in which the work is to be performed, an activity hazard analysis, environmental protection procedures, spill containment procedures, residue and container disposal procedures, and noncompliance reporting and response procedures.

1.4.2 Acceptance of Plan and Proposed Changes

Acceptance of the Contractor's plan is required prior to any herbicide application. Acceptance of the plan will be conditional, subject to satisfactory implementation and performance. Acceptance shall not relieve the Contractor from compliance with all applicable local, state, and federal requirements. After acceptance of the plan, the Contractor shall notify the Contracting Officer in writing a minimum of seven days prior to any proposed change. Proposed changes shall not be implemented until

reviewed and accepted by the Contracting Officer.

1.5 GRAZING

Grazing will not be permitted within the contract rights-of-way.

1.6 HAY HARVESTING

Unless otherwise approved, hay harvesting will not be permitted within the contract rights-of-way.

1.7 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Bermuda Grass Cultivar; GA.

The Contractor shall submit the Bermuda grass cultivar proposed for planting.

SD-09 Reports

Sampling and Testing; FIO.

The Contractor shall submit copies of all soil test and analysis results and recommended preplanting application times and rates for lime and fertilizer.

SD-13 Certificates

Fertilizer; FIO. Lime; FIO. Bermuda grass Sprigs; FIO. Bermuda Grass Seed; FIO.

Each delivery of fertilizer, lime, sprigs and seed shall be accompanied with a certificate from the manufacturer including specified data and attesting that the specified materials meet contract requirements.

PART 2 PRODUCTS

2.1 FERTILIZER

Fertilizer shall be commercial grade, uniform in composition, free flowing, and suitable for the Contractor's application method. Fertilizer shall be delivered in bulk or in labeled containers and shall conform to current Louisiana requirements for commercial fertilizer. Each delivery of fertilizer shall be accompanied with a certificate from the manufacturer including the name, type, guaranteed analysis, trademark, and warranty of the producer.

2.2 HERBICIDES

2.2.1 Herbicide Application

Herbicides shall be delivered to the mixing site in original, unopened

containers bearing legible labels indicating Environmental Protection Agency (EPA) registration numbers and manufacturer's registered uses. All operations associated with herbicide applications shall be in strict compliance with manufacturer's labels and material safety data sheets, the approved herbicide application plan, and all federal, state, and local requirements for applying herbicides. General-use herbicides shall only be applied under the supervision of, or by, personnel with current commercial applicator's certification from the state in which the work is being performed. Restricted-use herbicides shall only be applied by personnel with current restricted-use applicator's certification from the state in which the work is being performed.

2.2.2 Application Reporting

For each application, the Contractor shall include on daily CQC Reports, as a minimum, the following information: herbicide types and quantities applied, acreage treated, weather conditions, disposal methods utilized and exposure manhours.

2.3 LIME

Lime shall be agricultural grade lime containing not less than 85 percent total carbonates. Lime shall be ground to such fineness that 25 percent will pass a number 150 µm sieve and 100 percent will pass a 2.36 mm sieve.

2.4 MULCH

Mulch shall consist of Bermuda grass hay or wheat, rice or oat straw. Mulch shall be dry and free from Johnson grass or other noxious weeds and shall not be in an advanced state of decomposition.

2.5 BERMUDA GRASS SPRIGS AND/OR SEEDS

2.5.1 Selection Criteria

For seeding and sprigging, the Contractor shall select a common Bermuda grass cultivar that is known to spread rapidly and have sufficient winter hardiness for the region, such as Greenfield, Guymon, or Pasto-Rica. Hybrids shall not be used.

2.5.2 Bermuda Grass Sprigs

Bermuda grass sprigs consisting of healthy, living stems, stolons or rhizomes and attached roots with adhering soil shall be obtained from a registered or certified grower. Sprigs shall be free of noxious grasses or weeds. Sprigs of local origin shall be used.

2.5.3 Bermuda Grass Seed

Bermuda grass seed shall be obtained from a licensed dealer and labeled in accordance with U.S. Department of Agriculture rules and regulations under the Federal Seed Act. Labels are required for both bulk and bagged seed. Seed shall have a minimum 98 percent pure seed rate and 85 percent germination rate by weight and shall contain no more than one percent weed seeds. Seed shall be furnished in sealed, standard containers. Seed which has become wet, moldy or otherwise damaged in transit or storage will not be acceptable.

2.6 WATER

Water that is used as an aid to establishing turf shall be of irrigation quality and free of injurious quantities of oil, acid, alkali, salt, and other impurities detrimental to plant growth.

PART 3 EXECUTION

3.1 NEW TURF ESTABLISHMENT

3.1.1 General

The Contractor may elect to seed or sprig, or use a combination of seeding and sprigging to establish new turf. The Contractor shall be responsible for soil testing, embankment restoration, vegetation removal, soil preparation, preplanting fertilizing and liming, planting (sprigging and/or seeding), mulching, replanting, postplanting fertilizing, mowing, additional fertilizing, restoring eroded areas, all work during subsequent growing seasons, and establishment to the point of Bermuda grass coverage required in paragraph ESTABLISHMENT. Should the Contractor fail to perform the specified requirements, the Government may assume establishment responsibility and deduct the cost thereof from any payments due the Contractor.

3.1.2 Soil Testing

The Contractor shall obtain the services of an established soil testing entity to coordinate soil sampling, perform testing and analyses, and prepare recommendations for materials and procedures to be used during the preplanting phase of new turf establishment. When practicable, soil testing shall be performed early enough to permit lime (if required) to be applied sufficiently in advance of planting so that the soil pH adjustment will occur before planting. However, planting shall not be delayed for this purpose. Soil samples shall be taken along the entire length of new embankment at approximate 300 m intervals at the direction of the Contracting Officer. Samples shall be tested and analyzed to determine pH and fertility conditions. The test results and recommendations shall be used to determine the quantities required for preplanting lime and fertilizer applications. Lime recommendations shall consider probable time of application.

3.1.3 Advance Notification Requirements

During periods when no concurrent construction work is being performed, the Contractor shall notify the Contracting Officer a minimum of one day prior to performing any new turf establishment or new turf maintenance work when there has been a period of no work for 5 days or longer.

3.1.4 Vegetation Removal

Not less than 7 days or more than 14 days prior to beginning preplanting embankment restoration or soil preparation, mowing shall be performed to remove grasses, weeds and other vegetation from areas where new turf establishment is required. Mowing shall be performed to a height not to exceed 100 mm above the ground surface and the resulting clippings shall be removed from the job site.

3.1.5 Preplanting Embankment Restoration

After acceptance of the embankment and immediately prior to soil

preparation for planting, the Contractor shall restore eroded embankments. Eroded areas shall be restored to the grade and slope of adjacent areas that have not eroded. Adjacent areas that have not eroded shall not be degraded. Necessary repairs shall be made with suitable material placed and compacted as required for the original embankment in accordance with Section 02230 EMBANKMENT.

3.1.6 Soil Preparation

After the areas to be turfed have been restored to the required grades and slopes, the soil shall be thoroughly tilled to a depth of at least 100 mm by discing, harrowing, or other approved operations. Incorporation of preplanting lime and fertilizer applications may be accomplished as a part of this operation. Irregularities in the surface shall be dressed to provide a smooth surface that is within the tolerance for embankment and that will drain.

3.1.7 Preplanting Lime Application

Lime shall be applied at the time and rate indicated by soil test recommendations and incorporated into the soil by discing.

3.1.8 Preplanting Fertilizer Application

Immediately prior to planting, fertilizer shall be applied at the rate indicated by soil test recommendations and incorporated into the soil by discing.

3.1.9 Planting Options

3.1.9.1 Sprigging

Sprigging, including initial planting and all replanting, may be performed only during each February 1 through June 30 period, and shall be accomplished as early as practicable during this period. Minimum 150 mm long sprigs shall be used. Sprigs shall not be stored more than 48 hours between digging and planting. During storage, sprigs shall be kept moist and shaded. If a mechanical sprigger is used, sprigs at a minimum rate of 2.6 cubic meters/ha shall be planted at a depth of 50 mm or less. If a weighted disk is used, the soil shall first be firmed by rain or rolling. Sprigs shall then be broadcast at a minimum rate of 3.5 cubic meters/ha and incorporated into the soil by a weighted disk. The area shall then be firmed by rolling with a conventional tractor-drawn cultipacker or other approved device. Dormant sprigs shall be completely covered by not more than 25 mm of soil. Non-dormant sprigs shall have a minimum of 13 mm portions of their leaves uncovered.

3.1.9.2 Seeding

Seeding, including initial planting and all replanting, may be performed only during each April 1 through June 30 period, and shall be accomplished as early as practicable during this period, although it is recommended that soil temperature reach a minimum of 20 degrees C before seeding is performed. Hulled seeds shall either be broadcast in two passes made at right angles at a rate of 33.6 kg/ha, or drilled using row markers to a depth of 13 mm at a rate of 16.8 kg/ha. If broadcast, seed shall be covered by approximately 6 mm of soil and firmed by rolling with one pass of a conventional tractor-drawn cultipacker or other approved device not exceeding 134 kg/m of roller width. If seeding is performed with a seed

drill equipped with rollers, additional rolling is not required.

3.1.10 Mulching

Immediately after seeding or sprigging, mulch shall be applied uniformly on the soil surface at the rate of 3.36 t/ha (approximately 150 bales per hectare). Mulch shall be anchored into the soil with a mulch crimper. The mulch crimping equipment shall have straight, notched, dull blades no more than 250 mm apart and shall be equipped with scrapers. The mulching material shall be anchored at least 25 mm into the soil. Anchoring the mulch shall be performed parallel to the centerline of the levee. The mulch shall be applied by means of approved equipment suitable for such work.

3.1.11 Inspections and Reports

After initial planting, the Contractor shall inspect newly turfed areas at least once every two weeks during each April through September period. For each inspection conducted, the Contractor shall prepare a report summarizing the scope of the inspection, names of personnel making the inspection, inspection date, height of vegetation, observations and conclusions, and maintenance performed. The report shall be furnished to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC Report.

3.1.12 Replanting

Approximately one month after initial planting, the Contractor shall restore any eroded areas and perform soil preparation, fertilize, replant and mulch all bare spots larger than 9.3 square m in accordance with the requirements of paragraph PREPLANTING EMBANKMENT RESTORATION, paragraph SOIL PREPARATION, paragraph PREPLANTING FERTILIZER APPLICATION, paragraph SPRIGGING or paragraph SEEDING, and paragraph MULCHING, all at no additional cost to the Government. When initial planting is performed in June, replanting operations shall be performed as soon as practicable during the next specified planting season, unless otherwise approved by the Contracting Officer.

3.1.13 Postplanting Fertilizer Application

For those areas that do not require replanting, approximately one month after the initial planting, fertilizer shall be applied at the minimum rate of 67 kilograms of nitrogen per hectare. For areas planted after 31 May, postplanting fertilizer shall be the slow-release type.

3.1.14 New Turf Maintenance

The Contractor shall maintain each area receiving new turf until Bermuda grass on all areas to be turfed is established to the point of acceptance. During establishment and prior to acceptance, the Contractor shall restore any eroded areas or rutting damage to the completed embankment at no additional cost to the Government. The Contractor shall also maintain each area receiving new turf by mowing. During each April through September period, mowing shall begin when the tallest vegetation reaches 300 mm, and areas shall be kept mowed to a height between 100 and 300 mm above the embankment surface. Mowing shall be performed to a minimum distance of 1.5 m beyond the toe of the new levee embankment. Mowing shall be scheduled to minimize rutting. No mowing shall be performed during the months of October through March unless otherwise approved by the Contracting Officer.

3.1.15 Additional Fertilizer Requirements During First Growing Season

For each area planted during February through April, beginning approximately 30 days after postplanting fertilizer application, the Contractor shall make additional fertilizer applications at approximately 30 day intervals through June. Minimum rates of 67 kilograms of nitrogen and 45 kilograms of potassium per hectare shall be used. If the Contractor elects to apply higher rates of nitrogen, or to apply fertilizer during July or August to reduce establishment periods, it shall be the slow-release type. For each area planted during February through June, if growth has not reached the required coverage by the end of August, the Contractor shall apply fertilizer in September at a rate of 90 kilograms of potassium per hectare.

3.1.16 Requirements During Subsequent Growing Seasons

For newly turfed areas, during all growing seasons after the first growing season and prior to the date of acceptance of all new turf, as a minimum, the Contractor shall apply fertilizer during the months of April, May, and June at approximately 30 day intervals at minimum rates of 67 kilograms of nitrogen and 45 kilograms of potassium per hectare, restore eroded areas in accordance with paragraph PREPLANTING EMBANKMENT RESTORATION, mow in accordance with paragraph NEW TURF MAINTENANCE, and replant areas that have insufficient Bermuda grass to achieve the required coverage within each subsequent growing season in accordance with paragraph REPLANTING, all at no additional cost to the Government. If the Contractor elects to apply higher rates of nitrogen, or to apply fertilizer during July or August to reduce establishment periods, it shall be the slow-release type. If growth has not reached the required coverage by the end of August, the Contractor shall apply fertilizer in September at a rate of 90 kilograms of potassium per hectare.

3.1.17 Coordination Meeting

Prior to April 1 of each subsequent growing season, the Contractor shall meet with the Contracting Officer at the job site to identify bare spots, eroded areas and rutting damage and to discuss the Contractor's plan of operation for completing new turf establishment. The Contractor shall contact the Contracting Officer to mutually schedule this meeting at least 7 days prior to the meeting.

3.1.18 Establishment

Turf will be considered to be established and completed when the areas to be turfed have produced Bermuda grass stems or runners which overlap adjacent Bermuda grass growth over a minimum of 85 percent of the entire area as determined by the Contracting Officer by random sampling on a square meter basis and when the areas to be turfed have no spots greater than 0.37 square meter that are void of Bermuda grass.

3.1.19 Inspection and Acceptance

Acceptance of the entire turfed area will be based on the Contracting Officer's visual inspection and determination of the required coverage. Acceptance will be based on coverage by Bermuda grass only. Dying or dead turf and eroded areas will not be accepted. Partial reaches will not be accepted unless determined by the Contracting Officer to be in the best interest of the Government.

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02960

EROSION CONTROL

PART 1 GENERAL

1.1 SUBMITTALS
1.2 AREAS TO RECEIVE EROSION CONTROL

PART 2 PRODUCTS

2.1 FERTILIZER
2.2 SEED
2.2.1 Alternative A
2.2.2 Alternative B
2.3 MULCH

PART 3 EXECUTION

3.1 EROSION CONTROL
3.1.1 Dressing
3.1.2 Application
3.2 MULCHING

-- End of Section Table of Contents --

SECTION 02960

EROSION CONTROL

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Fertilizer; FIO.

The Contractor shall submit signed copies of invoices from suppliers which show quantities and the percentages of nitrogen, phosphorous, and potash.

1.2 AREAS TO RECEIVE EROSION CONTROL

All disturbed areas within the contract rights-of-way except borrow areas, areas to receive other types of surfacing, and areas to receive new turf establishment in accordance with Section 02933 NEW TURF ESTABLISHMENT, shall receive erosion control as specified herein.

PART 2 PRODUCTS

2.1 FERTILIZER

Fertilizer shall meet the requirements of the State of Louisiana for commercial fertilizer. Fertilizer shall have a minimum analysis of 13 percent nitrogen, 13 percent phosphorus, and 13 percent potash (13-13-13). Duplicate signed copies of invoices from suppliers shall be furnished to the Contracting Officer upon delivery to the worksite. Invoices shall show quantities and percentages of nitrogen, phosphorus, and potash.

2.2 SEED

Grass seeds shall be labeled in accordance with the U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act in effect on the date of purchase. The seed shall have a minimum purity of 90 percent and a minimum germination rate of 80 percent. Seeding mixtures shall be in accordance with the following:

2.2.1 Alternative A

If seeding is done during the period of 1 March through 30 September, the seeding mixture shall consist of a uniform mixture of 11 kg of Bahia and 11 kg of Bermuda Grass (hulled) seed per hectare.

2.2.2 Alternative B

If seeding is done during the period of 1 October through 28 February, the seeding mixture shall consist of a uniform mixture of 22 kg of Rye and 11 kg

of Bermuda Grass (unhulled) seed per hectare.

2.3 MULCH

The mulch shall be a vegetative mulch consisting of grain straw (oats, wheat, or rice) or grass hay.

PART 3 EXECUTION

3.1 EROSION CONTROL

3.1.1 Dressing

The areas to receive erosion control shall be dressed by the cutting off of high points and the filling of depressions to the extent necessary to provide a reasonably smooth surface that can be readily traveled by a farm tractor pulling a rotary type mower.

3.1.2 Application

After dressing, the areas to receive erosion control shall be fertilized and seeded. Fertilizer shall be uniformly distributed at a rate of 225 kg per hectare over areas to be seeded and shall be incorporated into the soil to a depth of at least 100 mm by disking, harrowing, or other acceptable methods. Fertilizer shall be uniformly distributed over the entire surface at a rate of 225 kg per hectare and lightly harrowed no deeper than 25 mm. After dressing has been completed and fertilizer incorporated, surfaces shall be seeded by uniformly distributing the applicable mixture of grass seed specified in paragraph SEED per each hectare. After the seed has been distributed, the entire finished surface shall be compacted by two passes of a conventional tractor-drawn cultipacker.

3.2 MULCHING

Mulching shall be performed within 24 hours after seeding. Mulch shall be applied uniformly on the soil surface at the rate of 3.4 metric tons per hectare. The mulch shall be anchored into the soil with a mulch crimper. The mulch crimping equipment shall have straight, notched, dull blades no more than 255 mm apart and shall be equipped with scrapers. The mulching material shall be anchored at least 25 mm into the soil. Anchoring the mulch shall be performed along the contour of the ground surface. The mulch shall be applied by means of approved equipment suitable for such work.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02961

LIME TREATMENT OF STRUCTURE EMBANKMENT

PART 1 GENERAL

1.1 REFERENCES
1.2 SUBMITTALS

PART 2 PRODUCTS

2.1 Hydrated Lime

PART 3 EXECUTION

3.1 GENERAL
3.2 SPREADING AND MIXING LIME
3.2.1 Soil Processing Area
3.2.2 Spreading
3.2.3 Mixing and Curing
3.3 PLACEMENT AND COMPACTION
3.3.1 Top Soil
3.4 WEATHER LIMITATIONS

-- End of Section Table of Contents --

SECTION 02961

LIME TREATMENT OF STRUCTURE EMBANKMENT

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 698	(1991; R 1998) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))
ASTM C 977	(1995) Quicklime and Hydrated Lime for Soil Stabilization
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-13 Certificates

Hydrated Lime; FIO

The Contractor shall submit a statement signed by responsible official of the manufacturer of the hydrated lime attesting that the material meets specified requirements. The statement must be dated after the award of this contract, must name the project, and must list the specific requirements which are being certified.

PART 2 PRODUCTS

2.1 Hydrated Lime

Hydrated lime shall meet the requirements of ASTM C 977.

PART 3 EXECUTION

3.1 GENERAL

The structure embankment shall be 1 meter capped with a thick layer of lime treated embankment as specified in this section and to the limits as shown in the drawings.

3.2 SPREADING AND MIXING LIME

3.2.1 Soil Processing Area

A soil processing area will be required to treat the soil with lime. The processing area shall be located within the right-of-way limits of the structure and as approved by the Contracting Officer. The processing area shall be cleared in accordance with Section 02111 CLEARING AND GRUBBING. The first 150 to 300 mm of topsoil shall be removed from the processing area prior to placement of any material therein, and stockpiled for later use.

3.2.2 Spreading

The maximum thickness of material to be placed in the soil processing area for treatment may not exceed the maximum thickness which the mixing equipment is capable of mixing. The moisture content of the soil placed in the processing area shall be determined by performing a moisture test using the nuclear density gauge in accordance with ASTM D 2922. When mixing lime, the moisture content of the soil being treated shall be between optimum and 5 percent above the optimum moisture content for compaction as determined by ASTM D 698. Hydrated lime conforming to ASTM C 977 shall be applied to the soil in two (2) applications at a rate of 3 percent of lime per application based on the dry unit weight of the soil being treated. A dry unit weight of 1280 kg/m3 will be used for the soil to compute the required rate of application of lime by weight. Any lime that has been exposed to the atmosphere for a period in excess of six (6) hours and lime lost or damaged before applying it to the soil due to rain, wind, or other causes, shall not be used.

3.2.3 Mixing and Curing

After each application of lime, a liberal amount of water shall be applied over the surface to prevent dusting and achieve good distribution of the lime. Water shall be added even if the moisture content is above the optimum moisture content for compaction. Mixing of the lime with the soil shall be accomplished with a high speed rotary pulverizer. The first application of lime shall be mixed into the soil with at least one pass of the rotary pulverizer and scaled to minimize evaporation loss, lime carbonation and excessive wetting by rainfall. Sealing may be accomplished by lightly compacting the surface of the treated layer with a pneumatic tire or smooth steel wheel roller. The initial mixture of lime, soil, and water shall be completed in the same workday it was started. The size of the daily work area shall be restricted to assure this is accomplished. The initial lime-soil mixture shall remain sealed and cured for a minimum of 48 hours. During the curing of the initial lime-soil mixture, the moisture content shall be maintained at or above the optimum moisture content by sprinkling with water, remixing and resealing. After the required curing time, the second application of lime shall be applied and mixed with the rotary pulverizer until 100 percent of the lime-soil mixture passes the one inch sieve and 60 percent passes the No. 4 sieve. The lime-soil mixture shall be placed in the structure embankment and compacted as soon as possible after the mixing is complete but no longer than 8 hours. When moving the lime-soil mixture from the soil processing area to its final location, precautions shall be taken to avoid any unmixed materials.

3.3 PLACEMENT AND COMPACTION

Immediately before placement of the treated soil, the subgrade shall be scarified and watered to assure that the moisture content is comparable to the material to be placed in the structure. The treated soil shall be placed in horizontal lifts and, if placed against existing embankment, shall be benched in a stairstepped pattern at 300 mm intervals. Lime soil mixture shall be placed at the limits shown on the drawings to produce a 1 meter (measured perpendicular to the embankment slope) lime treated cap. Placement and compaction of the lime treated soil within the structure embankment shall be accomplished as specified in Section 02226 EXCAVATION, FILL, AND BACKFILL FOR STRUCTURES, paragraph PLACEMENT and paragraph COMPACTION.

3.3.1 Top Soil

One hundred fifty to three hundred millimeters of previously removed top soil shall be placed over lime treated areas for quicker erosion control protection.

3.4 WEATHER LIMITATIONS

No lime treatment shall be performed when the atmospheric temperature is less than 5 degrees C. No frozen soil conditions will be allowed and atmospheric temperature during curing shall not be less than -1 degrees C.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 03 - CONCRETE

SECTION 03101

FORMWORK FOR CONCRETE

PART 1 GENERAL

1.1 REFERENCES
1.2 DESIGN REQUIREMENTS
1.3 SUBMITTALS
1.4 SHOP DRAWINGS

PART 2 PRODUCTS

2.1 MATERIALS
2.1.1 Forms and Form Liners
2.1.1.1 Class "C" Finish
2.1.1.2 Class "D" Finish
2.1.2 Form Coating
2.2 ACCESSORIES

PART 3 EXECUTION

3.1 INSTALLATION
3.1.1 Form Construction
3.1.2 Chamfering
3.1.3 Coating
3.2 FORM REMOVAL
3.2.1 Formwork Not Supporting Weight of Concrete
3.2.2 Formwork Supporting Weight of Concrete
3.3 INSPECTION

-- End of Section Table of Contents --

SECTION 03101

FORMWORK FOR CONCRETE

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ACI INTERNATIONAL (ACI)

ACI 347R	(1994) Guide for Formwork for Concrete

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 31	(1996) Making and Curing Concrete Test Specimens in the Field
ASTM C 39	(1996) Compressive Strength of Cylindrical Concrete Specimens
ASTM C 1077	(1998) Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation

1.2 DESIGN REQUIREMENTS

The design, engineering, and construction of the formwork shall be the responsibility of the Contractor. The formwork shall be designed for anticipated live and dead loads and shall comply with the tolerances specified in Section 03307 CONCRETE, paragraph CONSTRUCTION TOLERANCES. However, for surfaces with an ACI Class A surface designation, the allowable deflection for facing material between studs, for studs between walers and walers between bracing shall be limited to 0.0025 times the span. The formwork shall be designed as a complete system with consideration given to the effects of cementitious materials and mixture additives such as fly ash, cement type, plasticizers, accelerators, retarders, air entrainment, and others. The adequacy of formwork design and construction shall be monitored prior to and during concrete placement as part of the Contractor's approved Quality Control Plan.

1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Materials; FIO.

Manufacturer's literature shall be submitted for plywood, concrete form hard board, form accessories, prefabricated forms, form coating, and form-lining materials.

SD-04 Drawings

Shop Drawings; FIO.

Drawings and design computations for all formwork required shall be submitted at least 5 days either before fabrication on site or before delivery of prefabricated forms.

SD-08 Statements

Shop Drawings; FIO.

If reshoring is permitted, the method, including location, order, and time of erection and removal shall also be submitted for review.

SD-09 Reports

Inspection; FIO.

The Contractor shall submit field inspection reports for concrete forms and embedded items.

Formwork Not Supporting Weight of Concrete; GA.

If forms are to be removed in less than 24 hours on formwork not supporting weight of concrete, the evaluation and results of the control cylinder tests or maturity instrumentation shall be submitted to and approved by the Contracting Officer before the forms are removed.

1.4 SHOP DRAWINGS

The shop drawings and data submitted shall include the type, size, quantity, and strength of all materials of which the forms are made, the plan for jointing of facing panels, details affecting the appearance, and the assumed design values and loading conditions.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Forms and Form Liners

Forms and form liners shall be fabricated with facing materials that will produce a finish meeting the specified construction tolerance requirements and the following surface classifications as defined in ACI 347R.

2.1.1.1 Class "C" Finish

This class of finish shall apply to all surfaces except those specified to receive Class D. The form facing may be either tongue-and-groove lumber, plywood, concrete form hard board or steel. Wood form facing for curved or warped surfaces shall be composed of splines of lumber which can be bent to the required shape without splitting or cracking.

2.1.1.2 Class "D" Finish

This class of finish shall apply to all surfaces which will be permanently concealed after construction. The form facing may be of wood or steel.

2.1.2 Form Coating

Form coating shall be commercial formulation that will not bond with, stain, cause deterioration, or any other damage to concrete surfaces. The coating shall not impair subsequent treatment of concrete surfaces depending upon bond or adhesion nor impede the wetting of surfaces to be cured with water or curing compounds. If special form liners are to be used, the Contractor shall follow the recommendation of the form coating manufacturer.

2.2 ACCESSORIES

Ties and other similar form accessories to be partially or wholly embedded in the concrete shall be of a commercially manufactured type. After the ends or end fasteners have been removed, the embedded portion of metal ties shall terminate not less than 50 mm from any concrete surface either exposed to view or exposed to water. Plastic snap ties may be used in locations where the surface will not be exposed to view. Form ties shall be constructed so that the ends or end fasteners can be removed without spalling the concrete.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Form Construction

Forms shall be constructed true to the structural design and required alignment. The form surface and joints shall be mortar tight and supported to achieve safe performance during construction, concrete placement, and form removal. The Contractor shall continuously monitor the alignment and stability of the forms during all phases to assure the finished product will meet the required surface classes specified in paragraph FORMS AND FORM LINERS and tolerances specified in paragraph DESIGN REQUIREMENTS. Failure of any supporting surface either due to surface texture, deflection or form collapse shall be the responsibility of the Contractor as will the replacement or correction of unsatisfactory surfaces. When forms for continuous surfaces are placed in successive units, care shall be taken to fit the forms over the completed surface to obtain accurate alignment of the surface and to prevent leakage of mortar. Forms shall not be re-used if there is any evidence of defects which would impair the quality of the resulting concrete surface. All surfaces of used forms shall be cleaned of mortar and any other foreign material before reuse.

3.1.2 Chamfering

All exposed joints, edges and external corners shall be chamfered by molding placed in the forms unless the drawings specifically state that chamfering is to be omitted or as otherwise specified. Chamfered joints shall not be permitted where earth or rock fill is placed in contact with concrete surfaces. Chamfered joints shall be terminated 300 mm outside the limit of the earth or rock fill so that the end of the chamfers will be clearly visible.

3.1.3 Coating

Forms for exposed or painted surfaces shall be coated with form oil or a form-release agent before the form or reinforcement is placed in final position. The coating shall be used as recommended in the manufacturer's instructions. Forms for unexposed surfaces may be wet with water in lieu of coating immediately before placing concrete, except that, in cold weather when freezing temperatures are anticipated, coating shall be mandatory. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete.

3.2 FORM REMOVAL

Forms shall not be removed without approval of the Contracting Officer. The minimal time required for concrete to reach a strength adequate for removal of formwork without risking the safety of workers or the quality of the concrete depends on a number of factors including, but not limited to, ambient temperature, concrete lift heights, type and amount of concrete admixture, and type and amount of cementitious material in the concrete. It is the responsibility of the Contractor to consider all applicable factors and leave the forms in place until it is safe to remove them. In any case forms shall not be removed unless the minimum time, the minimum compressive strength, or the minimum ambient temperature requirements below are met, except as otherwise directed or specifically authorized. When conditions are such as to justify the requirement, forms will be required to remain in place for a longer period. All removal shall be accomplished in a manner which will prevent damage to the concrete and ensure the complete safety of the structure. Where forms support more than one element, the forms shall not be removed until the form removal criteria are met by all supported elements. Form removal shall be scheduled so that all necessary repairs can be performed as specified in Section 03307 CONCRETE, paragraph FINISHING. Evidence that concrete has gained sufficient strength to permit removal of forms shall be determined by tests on control cylinders. All control cylinders shall be stored in the structure or as near the structure as possible so they receive the same curing conditions and protection methods as given those portions of the structure they represent. Control cylinders shall be removed from the molds at an age of no more than 24 hours. All control cylinders shall be prepared and tested in accordance with ASTM C 31 and ASTM C 39 at the expense of the Contractor by an independent laboratory that complies with ASTM C 1077 and shall be tested within 4 hours after removal from the site.

3.2.1 Formwork Not Supporting Weight of Concrete

Formwork for walls, columns, sides of beams, gravity structures, and other vertical type formwork not supporting the weight of concrete shall not be removed in less than 24 hours after concrete placement is completed. Control cylinders shall be prepared for each set of forms to be removed before 24 hours. The stability of the concrete shall be evaluated by a structural engineer prior to removal of the forms.

3.2.2 Formwork Supporting Weight of Concrete

Supporting forms and shoring shall not be removed until structural members have acquired sufficient strength to safely support their own weight and any construction or other superimposed loads to which the supported concrete may be subjected. As a minimum, forms shall be left in place until control concrete test cylinders or maturity instrumentation indicate evidence the concrete has attained at least 70 percent of the compressive strength required for the structure in accordance with the quality and

location requirements of Section 03307 CONCRETE.

3.3 INSPECTION

Forms and embedded items shall be inspected in sufficient time prior to each concrete placement by the Contractor in order to certify to the Contracting Officer that they are ready to receive concrete. The results of each inspection shall be reported in writing.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 03 - CONCRETE

SECTION 03307

CONCRETE

PART 1 GENERAL

1.1 REFERENCES
1.2 DESIGN AND PERFORMANCE REQUIREMENTS
1.2.1 Strength
1.2.2 Construction Tolerances
1.2.3 Concrete Mixture Proportions
1.3 SUBMITTALS
1.4 REGULATORY REQUIREMENTS

PART 2 PRODUCTS

2.1 MATERIALS
2.1.1 Cementitious Materials
2.1.1.1 Portland Cement
2.1.1.2 Pozzolan
2.1.2 Aggregates
2.1.3 Admixtures
2.1.3.1 Air-Entraining Admixture
2.1.3.2 Accelerating Admixture
2.1.3.3 Water-Reducing or Retarding Admixture
2.1.4 Water
2.1.5 Reinforcing Steel
2.1.6 Waterstops
2.1.7 Curing Materials
2.1.7.1 Impervious Sheet Materials
2.1.7.2 Membrane-Forming Curing Compound

PART 3 EXECUTION

3.1 PREPARATION
3.1.1 General
3.1.2 Embedded Items
3.1.3 Production of Concrete
3.1.3.1 Ready-Mixed Concrete
3.1.3.2 Concrete Made by Volumetric Batching and Continuous Mixing
3.1.3.3 Batching and Mixing Equipment
3.1.4 Equipment and Accessories
3.1.4.1 Hdrophilic Waterstops
3.2 CONVEYING AND PLACING CONCRETE
3.2.1 General
3.2.2 Consolidation
3.2.3 Cold-Weather Requirements
3.2.4 Hot-Weather Requirements
3.3 FINISHING
3.3.1 General

3.3.2 Finishing Formed Surfaces
3.3.3 Finishing Unformed Surfaces
3.3.3.1 Float Finish
3.3.3.2 Broom Finish
3.4 CURING AND PROTECTION
3.5 TESTS AND INSPECTIONS
3.5.1 General
3.5.2 Inspection Details and Frequency of Testing
3.5.2.1 Preparations for Placing
3.5.2.2 Air Content
3.5.2.3 Slump
3.5.2.4 Consolidation and Protection
3.5.3 Action Required
3.5.3.1 Placing
3.5.3.2 Air Content
3.5.3.3 Slump
3.5.4 Reports

-- End of Section Table of Contents --

SECTION 03307

CONCRETE

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ACI INTERNATIONAL (ACI)

ACI 308	(1992; R 1997) Standard Practice for Curing Concrete
ACI 318M/318RM	(1995) Building Code Requirements for Reinforced Concrete and Commentary
ACI 347	(1994) Formwork for Concrete

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 185	(1997) Steel Welded Wire Fabric Plain for Concrete Reinforcement
ASTM A 615/A 615M	(1996a) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM C 31/C 31M	(1996) Making and Curing Concrete Test Specimens in the Field
ASTM C 33	(1997) Concrete Aggregate
ASTM C 39	(1996) Compressive Strength of Cylindrical Concrete Specimens
ASTM C 94	(1998) Ready-Mixed Concrete
ASTM C 143/C 143M	(1997) Slump of Hydraulic Cement Concrete
ASTM C 150	(1997a) Portland Cement
ASTM C 171	(1997a) Sheet Materials for Curing Concrete
ASTM C 172	(1997) Sampling Freshly Mixed Concrete
ASTM C 231	(1997) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	(1997) Air-Entraining Admixtures for Concrete
ASTM C 309	(1997) Liquid Membrane - Forming Compounds for Curing Concrete

ASTM C 494	(1998) Chemical Admixtures for Concrete
ASTM C 618	(1998) Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
ASTM C 685	(1997) Concrete Made by Volumetric Batching and Continuous Mixing
ASTM D 75	(1997) Sampling Aggregates

CORPS OF ENGINEERS (COE)

COE CRD-C 400	(1963) Water for Use in Mixing or Curing Concrete

1.2 DESIGN AND PERFORMANCE REQUIREMENTS

The Government will maintain the option to sample and test waterstop, aggregates and concrete to determine compliance with the specifications. The Contractor shall provide facilities and labor as may be necessary to assist the Government in procurement of representative test samples. Samples of aggregates will be obtained at the point of batching in accordance with ASTM D 75. Concrete will be sampled in accordance with ASTM C 172. Slump and air content will be determined in accordance with ASTM C 143/C 143M and ASTM C 231, respectively, when cylinders are molded. Compression test specimens will be made, cured, and transported in accordance with ASTM C 31/C 31M. Compression test specimens will be tested in accordance with ASTM C 39. Samples for strength tests will be taken not less than once each shift in which concrete is produced. A minimum of three specimens will be made from each sample; two will be tested at 28 days (90 days if pozzolan is used) for acceptance, and one will be tested at 7 days for information.

1.2.1 Strength

Acceptance test results will be the average strengths of two specimens tested at 28 days (90 days if pozzolan is used). The strength of the concrete will be considered satisfactory so long as the average of three consecutive acceptance test results equal or exceed the specified compressive strength, f'c, and no individual acceptance test result falls below f'c by more than 3.4 MPa.

1.2.2 Construction Tolerances

A Class "C" finish shall apply to all surfaces except those specified to receive a Class "D" finish. A Class "D" finish shall apply to all surfaces which will be permanently concealed after construction. The surface requirements for the classes of finish required shall be as specified in ACI 347.

1.2.3 Concrete Mixture Proportions

Concrete mixture proportions shall be the responsibility of the Contractor. Mixture proportions shall include the dry weights of cementitious material(s); the nominal maximum size of the coarse aggregate; the specific gravities, absorptions, and saturated surface-dry weights of fine and coarse aggregates; the quantities, types, and names of admixtures; and

quantity of water per cubic meter of concrete. All materials included in the mixture proportions shall be of the same type and from the same source as will be used on the project. Specified compressive strength f'c shall be 20.7 MPa at 28 days (90 days if pozzolan is used). The maximum nominal size coarse aggregate shall be 25 mm, in accordance with ACI 318M/318RM. The air content shall be between 4.5 and 7.5 percent. The slump shall be between 50 and 125 mm. The maximum water cement ratio shall be 0.50.

1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Air-Entraining Admixture; FIO. Accelerating Admixture; FIO. Water-Reducing or Retarding Admixture; FIO. Curing Materials; FIO. Reinforcing Steel; FIO. Waterstops; FIO.

Manufacturer's literature is available from suppliers which demonstrates compliance with applicable specifications for the above materials.

Batching and Mixing Equipment; FIO.

Batching and mixing equipment will be accepted on the basis of manufacturer's data which demonstrates compliance with the applicable specifications.

Conveying and Placing Concrete; FIO.

The methods and equipment for transporting, handling, depositing, and consolidating the concrete shall be submitted prior to the first concrete placement.

SD-09 Reports

Aggregates; FIO.

Aggregates will be accepted on the basis of certificates of compliance and test reports that show the material(s) meets the quality and grading requirements of the specifications under which it is furnished.

Concrete Mixture Proportions; FIO.

Ten days prior to placement of concrete, the Contractor shall submit the mixture proportions that will produce concrete of the quality required. Applicable test reports shall be submitted to verify that the concrete mixture proportions selected will produce concrete of the quality specified.

SD-13 Certificates

Cementitious Materials; FIO.

Certificates of compliance attesting that the concrete materials meet the requirements of the specifications shall be submitted in accordance with Section 01000 GENERAL CONTRACT REQUIREMENTS, paragraph CERTIFICATES OF COMPLIANCE. Cementitious material will be accepted on the basis of a

manufacturer's certificate of compliance, accompanied by mill test reports that the material(s) meet the requirements of the specification under which it is furnished.

Aggregates; FIO.

Aggregates will be accepted on the basis of certificates of compliance and tests reports that show the material(s) meet the quality and grading requirements of the specifications under which it is furnished.

1.4 REGULATORY REQUIREMENTS

The regulatory requirements listed below form a part of this specification to the extent referenced. The regulatory requirements are referred in the text by basic designation only. For aggregates the Contractor shall comply with:

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT (LA DOTD)

LA DOTD-01 (1992) Standard Specifications for Roads and Bridges

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Cementitious Materials

Cement shall be Portland cement and shall conform to appropriate specifications listed:

2.1.1.1 Portland Cement

ASTM C 150, Type I or II, low alkali.

2.1.1.2 Pozzolan

Pozzolan shall conform to ASTM C 618, Class C or F, including requirements of Tables 1A and 2A.

2.1.2 Aggregates

Aggregates shall meet the quality and grading requirements of ASTM C 33 Class Designations 4M or better or LA DOTD-01, state highway department specification in accordance with paragraph REGULATORY REQUIREMENTS.

2.1.3 Admixtures

Admixtures to be used, when required or approved, shall comply with the appropriate specification listed. Chemical admixtures that have been in storage at the project site for longer than 6 months or that have been subjected to freezing shall be retested at the expense of the Contractor at the request of the Contracting Officer and shall be rejected if test results are not satisfactory.

2.1.3.1 Air-Entraining Admixture

ASTM C 260

2.1.3.2 Accelerating Admixture

Accelerators shall meet the requirements of ASTM C 494, Type C or E.

2.1.3.3 Water-Reducing or Retarding Admixture

ASTM C 494, Type A, B, or D.

2.1.4 Water

Water for mixing and curing shall be fresh, clean, potable, and free from injurious amounts of oil, acid, salt, or alkali, except that unpotable water may be used if it meets the requirements of COE CRD-C 400.

2.1.5 Reinforcing Steel

Reinforcing steel bar shall conform to the requirements of ASTM A 615/A 615M, Grade 60. Welded steel wire fabric shall conform to the requirements of ASTM A 185. Details of reinforcement not shown shall be in accordance with ACI 318M/318RM, Chapters 7 and 12.

2.1.6 Waterstops

The Hydrophilic waterstop shall be preformed rubber having the following requirements.

PROPERTY	PREFORMED HYDROPHILIC NON-VULCANIZED RUBBER STRIP	TEST METHOD
Hardness (HS)	30 plus or minus 6	ASTM D 2240
Tensile Strength	100 maximum	ASTM D 412
Elongation Percent	500 maximum	ASTM D 412
Specific Gravity	1.18	ASTM D 792
Expansional	1.9 maximum	Method 2
Mass Change Percent 3	5	Method 4

Notes:

a. Expansion Coefficient by Volume.

b. Procedure: Determine the volume of dry sample. Immerse the sample in water for 10 days. Determine the volume of the sample after immersion. Calculate the Volume Expansion Coefficient.

c. Measure the durability. It reflects the amount of Hydrophilic agent that is lost through repeated cycles of hydration and dehydration.

d. Procedure: Determine the mass of sample (massx). Immerse sample in water at 70 degrees C for 72 hours. Follow by 168 hours of continuous drying at 50 degrees C. Determine mass of sample (massy). If no mass change has occurred, continue to dry for another 7 days.

Mass Change Percent = (100 - (massy)) x 100.

Provide other materials not specifically described, but required for a complete and proper installation as directed by manufacturer and approved..

2.1.7 Curing Materials

2.1.7.1 Impervious Sheet Materials

Impervious sheet materials, ASTM C 171, type optional, except polyethylene film, if used, shall be white opaque.

2.1.7.2 Membrane-Forming Curing Compound

ASTM C 309, Type 1-D or 2, Class A or B.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 General

Construction joints shall be prepared to expose coarse aggregate, and the surface shall be clean, damp, and free of laitance. Ramps and walkways, as necessary, shall be constructed to allow safe and expeditious access for concrete and workmen. Snow, ice, standing or flowing water, loose particles, debris, and foreign matter shall have been removed. Earth foundations shall be satisfactorily compacted. Spare vibrators shall be available. The entire preparation shall be accepted by the Government prior to placing.

3.1.2 Embedded Items

Reinforcement shall be secured in place; joints, anchors, and other embedded items shall have been positioned. Internal ties shall be arranged so that when the forms are removed all metal will be not less than 50 mm from concrete surfaces permanently exposed to view or exposed to water on the finished structures. Embedded items shall be free of oil and other foreign matters such as loose coatings or rust, paint, and scale. The embedding of wood in concrete will be permitted only when specifically authorized or directed. All equipment needed to place, consolidate, protect, and cure the concrete shall be at the placement site and in good operating condition.

3.1.3 Production of Concrete

3.1.3.1 Ready-Mixed Concrete

Ready-mixed concrete shall conform to ASTM C 94 except as otherwise specified.

3.1.3.2 Concrete Made by Volumetric Batching and Continuous Mixing

Concrete made by volumetric batching and continuous mixing shall conform to ASTM C 685.

3.1.3.3 Batching and Mixing Equipment

The Contractor shall have the option of using an on-site batching and mixing facility. The facility shall provide sufficient capacity to prevent cold joints. The method of measuring materials, batching operation, and mixer shall be submitted for review. On-site plant shall conform to the requirements of either ASTM C 94 or ASTM C 685.

3.1.4 Equipment and Accessories

3.1.4.1 Hdrophilic Waterstops

Waterstops shall be installed and spliced as directed by the manufacturer.

3.2 CONVEYING AND PLACING CONCRETE

3.2.1 General

Concrete placement shall not be permitted when weather conditions prevent proper placement and consolidation without approval. When concrete is mixed and/or transported by a truck mixer, the concrete shall be delivered to the site of the work and discharge shall be completed within 1-1/2 hours or 45 minutes when the placing temperature is 30 degrees C or greater unless a retarding admixture is used. Concrete shall be conveyed from the mixer to the forms as rapidly as practicable by methods which prevent segregation or loss of ingredients. Concrete shall be in place and consolidated within 15 minutes after discharge from the mixer. Concrete shall be deposited as close as possible to its final position in the forms and be so regulated that it may be effectively consolidated in horizontal layers 450 mm or less in thickness with a minimum of lateral movement. The placement shall be carried on at such a rate that the formation of cold joints will be prevented.

3.2.2 Consolidation

Each layer of concrete shall be consolidated by internal vibrating equipment. Internal vibration shall be systematically accomplished by inserting the vibrator through the fresh concrete in the layer below at a uniform spacing over the entire area of placement. The distance between insertions shall be approximately 1.5 times the radius of action of the vibrator and overlay the adjacent, just vibrated area by approximately 100 mm. The vibrator shall penetrate rapidly to the bottom of the layer and at least 150 mm into the layer below, if such a layer exists. It shall be held stationary until the concrete is consolidated and then withdrawn slowly at the rate of about 75 mm per second.

3.2.3 Cold-Weather Requirements

No concrete placement shall be made when the ambient temperature is below 2 degrees C or if the ambient temperature is below 5 degrees C and falling. Suitable covering and other means as approved shall be provided for maintaining the concrete at a temperature of at least 10 degrees C for not less than 72 hours after placing and at a temperature above freezing for the remainder of the curing period. Salt, chemicals, or other foreign materials shall not be mixed with the concrete to prevent freezing. Any concrete damaged by freezing shall be removed and replaced at the expense of the Contractor.

3.2.4 Hot-Weather Requirements

When the rate of evaporation of surface moisture, as determined by use of Figure 1 of ACI 308, is expected to exceed 1 kilogram per square meter per hour, provisions for windbreaks, shading, fog spraying, or covering with a light-colored material shall be made in advance of placement, and such protective measures shall be taken as quickly as finishing operations will allow.

3.3 FINISHING

3.3.1 General

No finishing or repair will be done when either the concrete or the ambient temperature is below 10 degrees C.

3.3.2 Finishing Formed Surfaces

All fines and loose materials shall be removed, and surface defects including tie holes shall be filled. All honeycomb areas and other defects shall be repaired. All unsound concrete shall be removed from areas to be repaired. Surface defects greater than 13 mm in diameter and holes left by removal of tie rods in all surfaces not to receive additional concrete shall be reamed or chipped and filled with dry-pack mortar. The prepared area shall be brush-coated with an approved epoxy resin or latex bonding compound or with a neat cement grout after dampening and filled with mortar or concrete. The cement used in mortar or concrete for repairs to all surfaces permanently exposed to view shall be a blend of portland cement and white cement so that the final color when cured will be the same as adjacent concrete.

3.3.3 Finishing Unformed Surfaces

All unformed surfaces that are not to be covered by additional concrete or backfill shall be float finished to elevations shown, unless otherwise specified. Surfaces to receive additional concrete or backfill shall be brought to the elevations shown and left as a true and regular surface. Exterior surfaces shall be sloped for drainage unless otherwise shown. Joints shall be carefully made with a jointing tool. Unformed surfaces shall be finished to a tolerance of 10 mm for a float finish as determined by a 3 m straightedge placed on surfaces shown on the plans to be level or having a constant slope. Finishing shall not be performed while there is excess moisture or bleeding water on the surface. No water or cement shall be added to the surface during finishing.

3.3.3.1 Float Finish

Surfaces to be float finished shall be screeded and darbied or bullfloated to eliminate the ridges and to fill in the voids left by the screed. In addition, the darby or bullfloat shall fill all surface voids and only slightly embed the coarse aggregate below the surface of the fresh concrete. When the water sheen disappears and the concrete will support a person's weight without deep imprint, floating should be completed. Floating should embed large aggregates just beneath the surface, remove slight imperfections, humps, and voids to produce a plane surface, compact the concrete, and consolidate mortar at the surface.

3.3.3.2 Broom Finish

A broom finish shall be applied to areas which will be subject to foot traffic. The concrete shall be screeded and floated to required finish plane with no coarse aggregate visible. After surface moisture disappears, the surface shall be broomed or brushed with a broom or fiber bristle brush in a direction transverse to that of the main traffic or as directed.

3.4 CURING AND PROTECTION

Beginning immediately after placement and continuing for at least 7 days, at least 3 days all concrete shall be cured and protected from premature

drying, extremes in temperature, rapid temperature change, freezing, mechanical damage, and exposure to rain or flowing water. All materials and equipment needed for adequate curing and protection shall be available and at the site of the placement prior to the start of concrete placement. Preservation of moisture for concrete surfaces not in contact with forms shall be accomplished by one of the following methods:

a. Continuous sprinkling or ponding.

b. Application of absorptive mats or fabrics kept continuously wet.

c. Application of sand kept continuously wet.

d. Application of impervious sheet material conforming to ASTM C 171.

e. Application of membrane-forming curing compound conforming to ASTM C 309, Type 1-D, on surfaces permanently exposed to view and Type 2 on other surfaces shall be accomplished in accordance with manufacturer's instructions.

The preservation of moisture for concrete surfaces placed against wooden forms shall be accomplished by keeping the forms continuously wet for 7 days. If forms are removed prior to end of the required curing period, other curing methods shall be used for the balance of the curing period. During the period of protection removal, the temperature of the air in contact with the concrete shall not be allowed to drop more than 15 degrees C within a 24 hour period.

3.5 TESTS AND INSPECTIONS

3.5.1 General

The individuals who sample and test concrete as required in this specification shall have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the ACI minimum guidelines for certification of Concrete Field Testing Technicians, Grade I.

3.5.2 Inspection Details and Frequency of Testing

3.5.2.1 Preparations for Placing

Foundation or construction joints, forms, and embedded items shall be inspected in sufficient time prior to each concrete placement by the Contractor to certify to the Contracting Officer that it is ready to receive concrete.

3.5.2.2 Air Content

Air content shall be checked at least once during each shift that concrete is placed. Samples shall be obtained in accordance with ASTM C 172 and tested in accordance with ASTM C 231.

3.5.2.3 Slump

Slump shall be checked once during each shift that concrete is produced. Samples shall be obtained in accordance with ASTM C 172 and tested in accordance with ASTM C 143/C 143M.

3.5.2.4 Consolidation and Protection

The Contractor shall ensure that the concrete is properly consolidated, finished, protected, and cured.

3.5.3 Action Required

3.5.3.1 Placing

The placing foreman shall not permit placing to begin until he has verified that an adequate number of acceptable vibrators, which are in working order and have competent operators, are available. Placing shall not be continued if any pile is inadequately consolidated.

3.5.3.2 Air Content

Whenever a test result is outside the specification limits, the concrete shall not be delivered to the forms and an adjustment shall be made to the dosage of the air-entrainment admixture.

3.5.3.3 Slump

Whenever a test result is outside the specification limits, the concrete shall not be delivered to the forms and an adjustment should be made in the batch weights of water and fine aggregate. The adjustments are to be made so that the water-cement ratio does not exceed that specified in the submitted concrete mixture proportion.

3.5.4 Reports

The Contractor shall prepare reports of all tests and inspections conducted at the project site.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 05 - METALS

SECTION 05500

MISCELLANEOUS METAL

PART 1 GENERAL

1.1 REFERENCES
1.2 SUBMITTALS
1.3 GENERAL REQUIREMENTS
1.4 WORKMANSHIP
1.5 ANCHORAGE

PART 2 PRODUCTS

2.1 SHOP PAINTING
2.2 STANDARD ARTICLES
2.3 HANDRAILS
2.3.1 Steel Handrails, Including Carbon Steel Inserts
2.4 LADDERS
2.5 METAL GRID WALKWAYS
2.6 PARTITIONS, DIAMOND MESH TYPE
2.7 SAFETY CHAINS

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS
3.2 ATTACHMENT OF HANDRAILS
3.3 INSTALLATION OF METAL GRID WALKWAYS
3.4 MOUNTING OF SAFETY CHAINS

-- End of Section Table of Contents --

SECTION 05500

MISCELLANEOUS METAL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A14.3	(1992) Ladders - Fixed - Safety Requirements

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M	(1997a) Carbon Structural Steel
ASTM A 53	(1997) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
ASTM A 123	(1997a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(1998) Structural Welding Code - Steel

FEDERAL SPECIFICATIONS (FS)

FS RR-C-271	(Rev D) Chains and Attachments, Welded and Weldless

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Miscellaneous Metal Items; GA.

Detail drawings indicating material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Detail drawings for the following items: walkways, handrails, ladders, and grab bars.

1.3 GENERAL REQUIREMENTS

The Contractor shall verify all measurements and shall take all field

measurements necessary before fabrication. Welding to or on structural steel shall be in accordance with AWS D1.1. Items specified to be galvanized, when practicable and not indicated otherwise, shall be hot-dip galvanized after fabrication. Galvanizing shall be in accordance with ASTM A 123. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

1.4 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish, and unless otherwise approved, exposed riveting shall be flush. Where tight fits are required, joints shall be milled. Corner joints shall be coped or mitered, well formed, and in true alignment. Work shall be accurately set to established lines and elevations and securely fastened in place. Installation shall be in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

1.5 ANCHORAGE

Anchorage shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; and lag bolts and screws for wood.

PART 2 PRODUCTS

2.1 SHOP PAINTING

Surfaces of ferrous metal except galvanized surfaces, shall be cleaned and shop coated with the manufacturer's standard protective coating unless otherwise specified. Surfaces of items to be embedded in concrete shall not be painted. Items to be finish painted shall be prepared according to manufacturer's recommendations or as specified.

2.2 STANDARD ARTICLES

Standard articles shall conform to ASTM A 36/A 36M. Sizes shall be as specified or as shown. Where material requirements are not specified, materials furnished shall be suitable for intended use and shall be subject to the approval of the Contracting Officer. Standard articles shall be installed as shown.

2.3 HANDRAILS

Handrails shall be designed to resist a concentrated load of 890 N in any direction at any point of the top of the rail or 292 Newtons per meter

applied horizontally to top of the rail, whichever is more severe.

2.3.1 Steel Handrails, Including Carbon Steel Inserts

Steel handrails, including inserts in concrete, shall be steel pipe conforming to ASTM A 53. Steel railings shall be 40 mm nominal size. Railings shall be hot-dip galvanized.

a. Fabrication: Joint posts, rail, and corners shall be fabricated by one of the following methods:

(1) Flush type rail fittings of commercial standard, welded and ground smooth with railing splice locks secured with 10 mm hexagonal recessed-head setscrews.

(2) Mitered and welded joints by fitting post to top rail and intermediate rail to post, mitering corners, groove welding joints, and grinding smooth. Railing splices shall be butted and reinforced by a tight fitting interior sleeve not less than 150 mm long.

(3) Railings may be bent at corners in lieu of jointing, provided bends are made in suitable jigs and the pipe is not crushed.

b. Removable sections, toe-boards, and brackets shall be provided as indicated.

2.4 LADDERS

Ladders shall be galvanized steel or aluminum, fixed rail type in accordance with ANSI A14.3.

2.5 METAL GRID WALKWAYS

Metal grid walkways shall be 1.994 mm minimum galvanized steel. The walkway shall consist of metal planks, 610 by 3050 or 3650 mm bolted or welded to support stands. Other sizes may be furnished if approved. In addition to end supports, a midspan support shall be provided when required to limit deflection. End supports shall be located to avoid uplift and to provide continuous runs.

2.6 PARTITIONS, DIAMOND MESH TYPE

Partitions shall be constructed of metal fabric attached to structural steel framing members. Fabric shall be expanded metal of 38 mm, No. 10 diamond mesh secured to channel frame by welding. Framing members shall be channels 38 by 3 mm minimum size. Channel frames shall be mortised and tenoned at intersections. Steel frames, posts, and intermediate members shall be of the sizes and shapes indicated. Cast-iron floor shoes and caps shall have setscrew adjustment. Doors and grilles shall be provided as indicated, complete with hardware and accessories including sliding mechanisms, locks, guard plates, sill shelves and brackets, and fixed pin butts. Doors and grilles shall have cover plates as indicated. A continuous rubber bumper shall be provided at bottom of grille frame. Locks shall be bronze, cylinder, mortise type. Ferrous metal portions of partitions and accessories shall be galvanized steel.

2.7 SAFETY CHAINS

Safety chains shall be galvanized welded steel, proof coil chain in accordance with FS RR-C-271, Type I, Class 4. Safety chains shall be straight link style, 5 mm diameter, minimum 39 links per meter and with bolt type snap hooks on each end. Eye bolts for attachment of chains shall be galvanized 10 mm bolt with 19 mm eye, anchored as indicated. Two chains shall be furnished for each guarded opening.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

All items shall be installed at the locations shown and according to the manufacturer's recommendations, and as directed by the Contracting Officer.

3.2 ATTACHMENT OF HANDRAILS

Handrails shall be installed as shown on the drawings.

3.3 INSTALLATION OF METAL GRID WALKWAYS

Metal grid walkways shall be installed as shown on the drawings.

3.4 MOUNTING OF SAFETY CHAINS

Safety chains shall be installed where indicated on the drawings.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 15 - MECHANICAL

SECTION 15151

SLUICE GATE AND MANUALLY OPERATED GATE HOIST

PART 1 GENERAL

1.1 REFERENCES
1.2 GENERAL REQUIREMENTS
1.2.1 Standard Products
1.2.2 Verification of dimensions
1.3 SUBMITTALS
1.4 DELIVERY, STORAGE AND HANDLING
1.4.1 General Requirements
1.4.2 Upon Delivery
1.5 WARRANTY
1.6 MAINTENANCE EQUIPMENT MATERIALS
1.6.1 Hoist Lubricants
1.6.2 Loading and Unloading
1.6.3 Inner Lift Nut
1.7 MATERIALS AND EQUIPMENT
1.8 DRAWINGS, DESIGN DATA AND COMPUTATIONS
1.8.1 Shop Drawings
1.8.2 Design Data and Computations
1.9 OPERATION AND MAINTENANCE MANUALS

PART 2 PRODUCTS

2.1 MATERIALS
2.1.1 Iron Castings
2.1.2 Bronze
2.1.3 Corrosion-Resisting Steel
2.2 EQUIPMENT
2.2.1 Gate
2.2.2 Frame
2.2.3 Guides
2.2.4 Slide
2.2.5 Wedging Devices
2.2.6 Seat Facings
2.2.7 Wall Thimble, (Drainage Structure, Item 1D, Sta. 0+560.97 Only)
2.2.8 Stem, Couplings, and Stem Guides
2.2.9 Fasteners
2.3 COMPONENTS
2.4 MANUALLY-OPERATED GATE HOISTS (Drainage Structure, Item 1D, Sta. 0+560.97 Only)
2.5 ACCESSORIES
2.5.1 Stem Cover
2.5.2 Name Plates
2.5.2.1 Plates
2.5.2.2 Identification
2.5.2.3 Instruction

2.6 FABRICATION
2.6.1 Shop/Factory Finishing
2.6.2 Painting of the Gate and Hoist
2.7 TESTS, INSPECTIONS AND VERIFICATIONS
2.7.1 Tests, Inspection
2.7.2 Assembly and Tests

PART 3 EXECUTION

3.1 ERECTION, INSTALLATION, APPLICATION
3.1.1 Special Techniques
3.1.2 Erecting Engineer
3.2 FIELD TESTS AND INSPECTIONS
3.2.1 Tests
3.2.1.1 General
3.2.1.2 Gate and Hoist
3.2.2 Inspection
3.3 PROTECTION

-- End of Section Table of Contents --

SECTION 15151

SLUICE GATE AND MANUALLY OPERATED GATE HOIST

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ASME INTERNATIONAL (ASME)

ASME B1.1	(1989) Unified Inch Screw Threads (UN and UNR Thread Form)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 48	(1994a) Gray Iron Castings
ASTM A 126	(1995) Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A 193	(1997a) Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
ASTM A 194/A 194M	(1997) Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service
ASTM A 276	(1997) Stainless and Heat-Resisting Steel Bars and Shapes
ASTM A 320/A 320M	(1994a) Alloy Steel Bolting Materials for Low-Temperature Service
ASTM A 582/A 582M	(1995b) Free-Machining Stainless and Heat Resisting Steel Bars
ASTM A 780	(1993a) Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM B 21	(1996) Naval Brass Rod, Bar, and Shapes
ASTM B 98/B 98M	(1997) Copper-Silicon Alloy Rod, Bar, and Shapes
ASTM B 150M	(1995a) Aluminum Bronze Rod, Bar, and Shapes
ASTM B 584	(1996) Copper Alloy Sand Castings for General Applications

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C501 (1992) Cast-Iron Sluice Gates

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC SP 10 (1994) Near-White Blast Cleaning

1.2 GENERAL REQUIREMENTS

The contract drawings indicate the extent and general arrangement of the gate and hoist system. The gate and hoist shall fit into the allotted space and shall allow adequate acceptable clearances for installation, replacement, servicing and maintenance. All threads shall meet the requirements of ASME B1.1.

1.2.1 Standard Products

Materials and equipment shall be standard products of a manufacturer regularly engaged in the manufacture of such products, which are of a similar material, design and workmanship. The standard products shall have been in satisfactory use for at least 5 years prior to bid opening. The 5 years experience must be satisfactorily completed by a product which has been sold or is offered for sale on a commercial market through advertisements, manufacturers' catalogs, or brochures.

1.2.2 Verification of dimensions

The Contractor shall become familiar with all details of the work, verify all dimensions in the field, and advise the contracting Officer of any discrepancy, before performing any work.

1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Design Data and Computations; FIO.

Appropriate computations shall be submitted to substantiate the sizing of the gate stem and hoist.

Standard Products; FIO.

Catalog cuts shall be submitted for standard manufactured articles.

SD-04 Drawings

Shop Drawings; GA.

Complete shop drawings of gate and hoist shall be submitted for approval. Detailed drawings with dimensions for the gate, gate wedges, stem guides, stem, etc. shall be provided. Drawings of any items made specially or specifically for this project shall be true shop drawings. Outline drawings of standard manufactured items and equipment may be used in the assembly drawings.

SD-08 Statements

Delivery, Storage and Handling; GA.

Before storage begins, the Contractor shall submit: a complete description of the proposed storage processing method(s), including instructions for maintaining the protection during the storage period; a detailed description of the proposed storage facilities; and a plan for storage maintenance and inspection.

Equipment; FIO.

Five copies of the manufacturer's spare parts lists and/or bulletins for each item of mechanical equipment shall be furnished. These lists and/or bulletins shall clearly show all details and parts, and all parts shall be adequately described and/or have proper identification marks.

Erecting Engineer; GA.

The Contractor shall submit the credentials of the erecting engineer. The erecting engineer shall be full-time employees of, and designated as such by, the gate and/or hoist manufacturer, shall have had at least 5 years of experience with the type of gate and hoist furnished under these specifications.

Hoist Lubricants; FIO.

The Contractor shall submit a list of all lubricants recommended by the gate and hoist manufacturer indicating lubricant manufacturer's name and product number.

SD-13 Certificates

Materials and Equipment; FIO.

The Contractor shall submit written certificates for materials and equipment.

SD-14 Samples

Materials; GA.

The Contractor shall submit material samples as directed.

SD-19 Operation and Maintenance Manuals

Gate and Hoist; FIO.

The Contractor shall furnish five copies of installation, operation, maintenance, lubrication, and repair manuals for all equipment installed.

1.4 DELIVERY, STORAGE AND HANDLING

1.4.1 General Requirements

Prior to shipment from the manufacturer's plant, the Contractor shall prepare the gate and hoist for shipment. The gate and hoist shall be protectively processed for not less than 24-month storage, either outdoors

or indoors as the case may be, at the destination. Bulky parts of the gate not particularly susceptible to damage from exposure, such as the frame, slide, etc., may be stored outdoors. Other parts, such as fasteners, stem, and the complete hoist, shall be protected from the weather. Surfaces of items or of portions of items which are to be embedded in or rest on concrete shall be cleaned of all dirt, rust, and other foreign coatings, not including closely adhering mill scale, and then coated with a rust preventative. The rust preventative coating shall be the cold-application, solvent cutback type, similar and equal to Tectyl 502C of the Ashland Oil, Inc. All large, bulky, and/or heavy elements shall be mounted on skids or pallets of ample size and strength to facilitate loading and unloading. All small parts shall be boxed in sturdy wood or heavy corrugated paperboard boxes. A packing list, indicating the contents of each such box and enclosed in a moisture-proof envelope, shall be securely fastened to the outside of the box. The skid and/or pallet mounting and the boxing shall be done in a manner which will prevent damage to the gate and hoist during loading, shipment, unloading, storage, and any associated and/or subsequent handling. Weatherproof covers shall be provided during shipment.

1.4.2 Upon Delivery

Upon delivery at the work site, bulky parts of the gate, such as the frame, slide, and wall thimble, which have been coated with a complete paint system in the manufacturer's plant, may be stored outdoors provided these parts are stored on wood blocking not less than 200 mm above the base of washed gravel or crushed stone not less than 25 mm thick. Items stored outdoors shall also be covered to protect seat facings and other machined surfaces.

1.5 WARRANTY

The Contractor shall furnish the Government, under separate cover, the manufacturer's standard commercial warranty for the gate and hoist.

1.6 MAINTENANCE EQUIPMENT MATERIALS

1.6.1 Hoist Lubricants

The Contractor shall furnish an additional 10 kg of each different hoist lubricant at no additional expense to the Government.

1.6.2 Loading and Unloading

Any special slings, strongbacks, skidding attachments, or other devices used in loading the equipment at the manufacturer's and/or fabricators' plants shall be furnished for unloading and handling at the destination and shall become the property of the Government.

1.6.3 Inner Lift Nut

One completely machined and finished spare inner lift nut member for each stem nut furnished.

1.7 MATERIALS AND EQUIPMENT

Where materials or equipment are specified to comply with requirements of ASTM, NEMA, or AWWA, the Contractor shall provide proof of such compliance. The label or listing of the specified agency will be acceptable evidence.

In lieu of the label or listing, a written certificate from an approved, nationally recognized testing organization equipped to perform such services, stating that the items have been tested and conform to the requirements and testing methods of the specified agency may be submitted. As an alternative to the above requirements, the manufacturer may submit a standard computer product selection printout based on the manufacturer's certified test data. Manufacturer shall certify that the computer selected equipment meets the requirements of ASTM, NEMA, or AWWA and the requirements of the drawings and these specifications.

1.8 DRAWINGS, DESIGN DATA AND COMPUTATIONS

1.8.1 Shop Drawings

Complete shop drawings of gate and hoist shall be submitted for approval. Detailed drawings with dimensions for the gate, gate wedges, stem guides, stem, etc., shall be provided. Drawings of any items made specially or specifically for this project shall be true shop drawings, but catalog cuts will be sufficient for standard manufactured articles, and outline drawings of such equipment may be used in the assembly drawings. However, for those items for which true shop drawings are not required, sufficient descriptive data and/or information, in addition to the catalog cuts, shall be submitted to demonstrate compliance with the specifications. The embedded items and structural openings and clearances, which are dependent upon the gate design, shall be included with the shop drawings. After completion of the installation of the equipment the Contractor shall submit a complete set of "as-built" information.

1.8.2 Design Data and Computations

All design data, including friction factors, unseating heads, seating heads and weights of stem and slide shall also be included. It is the intent of this requirement that all design data required for checking the hoist, stems and all appurtenances be provided. The following calculations and data shall be included:

a. The maximum required stem opening and closing loads.

(1) Solid Stem Diameter.

(2) Threaded Stem root diameter.

(3) Thread pitch and lead.

(4) The longest unsupported length of solid stem.

(5) The longest unsupported length of threaded stem.

(6) Stem factor to convert stem thrust to lift nut torque.

(7) Location of stem guides

(8) Maximum recommended load on the weakest section and the l/r ratio of the that section.

b. The manufacturer's published thrust output rating of the submitted actuator, using the selected stem configuration and a 40 pound pull on its standard handwheel.

(1) Overall ratio of actuator.

(2) Actuator published maximum mechanical torque rating.

c. Diagrams showing all manual control and protective and signal devices required for the operation of the hoist shall be submitted for approval.

1.9 OPERATION AND MAINTENANCE MANUALS

The installation, operation, maintenance, lubrication, and repair manuals shall contain complete information required for the installation, operation, lubrication, adjustment, routine and/or special maintenance, disassembly, repair, and reassembly of the gate and hoist furnished.

PART 2 PRODUCTS

2.1 MATERIALS

All materials shall be free from defects and imperfections, of recent manufacture and unused, and of the classifications and grades specified unless otherwise approved. Materials not specifically described shall, as far as practicable, conform to the latest specifications on the American Society for Testing and Materials.

All materials, supplies, and articles not manufactured by the Contractor shall be the products of recognized reputable manufacturers. Equipment, materials, and articles installed or used, without prior submission as a sample for the approval, will be installed or used at the risk of subsequent rejection by the Contracting Officer.

2.1.1 Iron Castings

Material for iron castings shall meet the applicable requirements of either ASTM A 48 for "Class Nos. 30A, 30B, or 30C" or ASTM A 126 for "Class B."

2.1.2 Bronze

Bronze castings for such items as wedges, thrust nuts, lift nuts, all couplings shall meet the applicable requirements of ASTM B 584 for Copper Alloy No. 865. Bronze extrusions for seat facings in the frame and slide shall meet the applicable requirements of ASTM B 21 for "Copper Alloy No. 464 or No. 482." Bronze for fasteners, adjusting screws, and lock nuts shall meet the applicable requirements of ASTM B 98/B 98M for "Copper Alloy No. 651 or No. 655," or ASTM B 150M for Copper Alloy No. 614, No. 623, or No. 630.

2.1.3 Corrosion-Resisting Steel

Corrosion-resisting steel rods for stems shall meet the applicable requirements of either ASTM A 276 for Type 302 or 304 or ASTM A 582/A 582M for Type 303. Corrosion-resisting steel for fasteners shall meet either the above-mentioned specification or ASTM A 320/A 320M for Grades B8, or ASTM A 193 for Identification Symbols B8, B8A, B8M, or B8MA and ASTM A 194/A 194M for Grades 8, 8F, or 8M.

2.2 EQUIPMENT

The following paragraphs may at times describe or refer to only one item,

assembly, or arrangement, but these requirements shall apply to all such items, assemblies, or arrangements furnished under these specifications.

The sluice gate and hoist shall be products of a manufacturer who has been regularly engaged during the past 5 years in the production of similar sized gates and hoists for the design heads specified. Liberal safety factors shall be used in the design of the gate and hoist. Based on the heads specified, working stresses shall not exceed the lower value of either one third of the yield strength or one-fifth of the ultimate strength of the material.

2.2.1 Gate

The gate shall fit the opening indicated and shall be designed for the conditions indicated by the drawings. The gate shall be cast-iron, fully bronze mounted, shall have side wedging devices for seating heads, and shall be the rising stem type. The gate manufacturers name, gate model, size, seating and unseating heads and date of manufacture, shall be cast on the downstream surface of the gate slide or otherwise permanently affixed using a bronze plate. Gates shall meet the requirements of AWWA C501.

2.2.2 Frame

The frame shall be the flat back type of one-piece, cast-iron construction. Structural openings required to install the flange back type frame in limited spaces shall conform to the manufacturer's recommended practice. All contact surfaces of the frame shall be machine-finished. The frame shall have machined dovetail type grooves on its front face to accommodate the seat facings. The back face of the frame shall be drilled and machined to bolt directly to the face of the concrete headwall. The frame shall have integrally cast pads with machined surfaces and keyways to receive the slide-wedging devices.

2.2.3 Guides

The guides shall be of one-piece, cast-iron construction, conservatively designed to withstand the total thrust due to the water pressure and the wedging action. The guides shall be machine-finished on all contact surfaces, and a groove shall be machined the full length of the guide to provide sufficient clearance between the slide tongue and the guide groove to permit free movement and ensure proper engagement of the wedging devices. Provision shall be made to prevent lateral movement of the guide. The guides shall be sufficiently long to retain and support at least one-half of the slide when the gate is in the full-open position. The guides shall be attached to the frame with steel and bronze fasteners and shall be doweled to prevent relative motion between the guides and frame. Integrally cast pads with machined surfaces shall be provided for attachment of the wedging devices.

2.2.4 Slide

The slide shall be either square or rectangular and of one piece, cast-iron construction with integrally cast vertical and horizontal ribs and a reinforced section around the perimeter to provide for the seat facings. The slide shall have machined dovetail type grooves on its seating face to accommodate the seating facings. A tongue shall be provided on each side of the slide, shall extend its full length, and shall be machined on all sides to provide sufficient clearance between the tongue and the guide groove to permit free movement. Integrally cast pads shall be provided and

machine finished to receive the wedges. A stem nut pocket shall be cast integrally on the vertical centerline and above the horizontal center and shall be shaped to receive the stem nut.

2.2.5 Wedging Devices

The gate shall be provided with sufficient side wedging devices and top and bottom wedging devices where recommended by the manufacturer to provide a practical degree of water-tightness as approved by the Contracting Officer. The wedging devices shall be of solid cast bronze, machine-finished, on all contact surfaces and keyed to the cast-iron pads to maintain adjustment. The wedging devices shall be attached with either bronze or steel studs and bronze nuts, and the adjustable element shall be provided with a bronze adjusting screw with either a bronze lock nut or another approved locking device.

2.2.6 Seat Facings

Seat facings shall be of extruded bronze. The facings shall be of a special shape which, when impacted into place, will fill and be locked permanently into the dovetail type grooves in the frame, guides, and slide. Other methods of attachment will not be permitted. The width of the facing shall be not less than 20 mm. After attachment, the facings shall be machined to a plane surface and to at least a 1.6 micron finish. When the slide is in the fully closed position and wedges into position against the frame, the maximum clearance between the seating faces shall not exceed 0.004 inch.

2.2.7 Wall Thimble, (Drainage Structure, Item 1D, Sta. 0+560.97 Only)

The wall thimble shall be of one-piece, cast-iron construction and of "E" cross section and provided with an integrally cast ring or water stop. The front flange face shall be machine-finished to a plane surface and provided with tapped holes, using a template to match the drilling of the frame. The thimble shall be 0.3 m long, or as shown. The vertical centerline shall be clearly shown by permanent marks at the top and bottom of the machined surface and the word "TOP" shall be permanently marked thereon. To permit entrapped air to escape as the thimble is being encased in concrete, holes shall be cast or drilled in each entrapment zone formed by the reinforcing rib or the flange and waterstop. Either a permanent gasket of uniform thickness of 3M Weatherban 101 or equal mastic shall be provided to form a seal between the front face of the thimble and the back face of the frame.

2.2.8 Stem, Couplings, and Stem Guides

The stem shall be of sufficient diameter to withstand, without buckling or permanent distortion, the stresses induced by closing the gate and shall be designed to transmit not less than two times the rated output of the hoist with a 18 kg effort on the crank. Stem threads shall be either machine cut or cold rolled and of the double-lead ACME type. The stem and nut threads shall have sufficient contact area so that the contact pressure will not exceed 35 MPa when the maximum stem thrust is exerted. The stem thread surfaces in contact with the lift nut shall have not rougher than 0.8 micron finish. The stem shall be of corrosion resisting steel sections joined with either bronze or corrosion-resisting steel couplings which are threaded and keyed to the sections. All threaded and keyed couplings of the same size shall be interchangeable. The stem shall be provided at its lower end with a bronze thrust nut which all fit into the pocket provided

on the gate slide and which will positively prevent rotation of the stem. The stem shall be provided at its upper end with a bronze adjustable stop nut just above the hoist lift nut and shall be provided with a similar stop collar below the hoist. Stem guides shall be of cast-iron, bronze bushed and mounted on cast-iron brackets. They shall be drilled and slotted so as to be adjustable in two directions and shall be spaced at close enough intervals to support the stem adequately with an L/R ratio of not more than 200. The bronze bushing shall be machine bored 2 mm to 3 mm larger than the stem diameter. The stem guide, including the bronze bushing, shall be the two-piece collar type which can be installed and removed with the stem in place. The base plate type stem guide, if permitted, shall be of cast-iron with a bronze-bushed collar and may be of the one-piece type. The top of each stem section shall be drilled and tapped for installing an eye bolt for lifting the stem section during installation and removal of the stems.

2.2.9 Fasteners

All fasteners shall be of either silicon bronze or corrosion-resisting steel. Steel bolts and studs shall be provided with bronze nuts. The quantity and size of fasteners shall be as recommended by the gate manufacturer. Thread standards shall meet the requirements of ASME B1.1.

2.3 COMPONENTS

Each gate shall be raised and lowered by means of manual hoist units mounted where shown on the drawings. The units shall consist of complete, compact, rugged assemblies specially designed and manufactured for the required service by a manufacturer regularly engaged for at least 5 years in the production of this type of device, and shall be delivered completely wired, assembled and ready for installation. All parts of the lift mechanism shall be designed to move the gate slide at a rate of approximately 80 mm under the required operating head condition.

2.4 MANUALLY-OPERATED GATE HOISTS (Drainage Structure, Item 1D, Sta. 0+560.97 Only)

The gates shall be opened and closed by means of crank-operated hoist having either a single or double gear reduction depending upon the load and mounted on the operation platform. The hoists shall have cast bronze lift nuts threaded to match and engage with the stem threads. The lift nuts shall be provided with ball thrust or tapered roller bearings both above and below the flanges on the lift nut to accommodate the opening and closing thrusts. Adjustable stop collars shall be provided for installation of the stem just above the lift nut and accessibly below the hoist. All gearing shall be either steel or cast-iron housing. Positive mechanical seals to retain lubricant and exclude dirt and moisture shall be provided on the lift nut and pinion shafts where they extend through the housing. Lubrication fittings shall be provided for lubrication of all gears and bearings. A removable cast-iron crank with a rotating brass grip and a maximum radius of 0.4 m shall be provided. Design of the hoist shall be such that a maximum force of 18 kg at a 0.40 m radius will unseat the slide from its wedging devices at maximum design head. After the slide is unseated from its wedges, a maximum force of 11.5 kg at a 0.4 m radius shall operate the gate.

The hoist unit shall include a cast-iron pedestal, drilled and machined to accommodate the gear and lift nut housing, arranged to be bolted to the operating platform, and designed to position the input shaft about 1.0 m

above the platform. An arrow or arrows, with the word "OPEN" adjacent thereto, shall be either permanently attached to or cast on the housing to indicate the direction of rotation to open the gate. A brass instruction plate shall be affixed to the gate hoist stating manufacture, lubrication cycle and type of lubricant to be used.

2.5 ACCESSORIES

2.5.1 Stem Cover

A stem cover shall be provided. The stem cover shall be of galvanized steel pipe of sufficient diameter and length to permit full travel of the stem without obstruction or binding. The top of the cover shall be closed with a galvanized steel pipe cap. The cover shall be threaded into the top of the hoist to prevent rainwater entry. Prior to assembly, threaded portions of the stem cover, cap, and cap plug shall be coated with pipe compound. After installation of the cover, exposed threads shall be cleaned and degreased and then given a heavy coat of an approved zinc-rich protective coating, either meeting the applicable requirements of ASTM A 780 or an approved, commercially available similar material. A hole shall be drilled and tapped in the stem cover cap. Install an eye bolt for lifting the stem cover during installation and removal for repairs.

2.5.2 Name Plates

2.5.2.1 Plates

Name plates shall be made of corrosion-resisting metal with permanent marking with raised or depressed lettering and contrasting background made by machine engraving or machine stamping; hand engraving, such as would be done with an engraving pencil, is not acceptable.

2.5.2.2 Identification

The gate hoist shall be identified by means of a name plate permanently affixed to a conspicuous location. The plate shall bear the manufacturer's name, model designation, serial number, if applicable, and any other pertinent information such as speed, capacity, type, etc.

2.5.2.3 Instruction

As necessary, each hoist shall be equipped with suitably located instruction plates including any warnings and cautions describing any special and important procedures to be followed in operating and servicing the equipment. Plates shall be made of corrosion resisting metal with raised or depressed lettering and contrasting background.

2.6 FABRICATION

2.6.1 Shop/Factory Finishing

All workmanship, whether in the factory or the field, shall be performed in a skillful and workmanlike manner by qualified mechanics under competent supervision and direction; in accordance with the best modern practice for the various trades involved; and for the manufacture of high grade machinery. All parts shall have accurately machined mounting and bearing surfaces so that they can be assembled without fitting, chipping, or remachining. All parts shall conform to the design dimensions and shall be free of all defects in either workmanship or material that will impair

their service. All attaching bolt holes shall be accurately drilled to the layout indicated on the shop drawings.

2.6.2 Painting of the Gate and Hoist

The gate and hoist shall be dry blast cleaned to SSPC SP 10 (near white metal), followed by two to four mils of inorganic zinc primer and four to six mils of polyamide epoxy. The final shall be of three to five mils of aliphatic polyurethane, but sufficient to hide the previous coat. The finish color shall be grey. All coatings, thinners and cleaners shall be of the same manufacture. The Contractor shall submit the paint manufactures system and application methods he proposes for approval. All surface preparation and paint application is to be accordance with the paint manufacturers instructions.

2.7 TESTS, INSPECTIONS AND VERIFICATIONS

2.7.1 Tests, Inspection

The hoist shall be lubricated prior to any use or operation either in the shop or in the field. Each bearing shall be lubricated through its associated lubrication fitting, and the gears shall be packed with lubricant at assembly. After shop testing and prior to shipment, the bearings shall be relubricated. Prior to testing in the shop and to initial operation in the field, the gate seat facings and wedging devices shall be cleaned of all foreign material and lubricated thoroughly with a light grease.

2.7.2 Assembly and Tests

After completion of initial machining, the gate shall be completely assembled in the vertical position, and the wedging devices adjusted to exclude a 0.1 mm thickness gage between the frame and slide seating surfaces. Any additional machining needed to achieve this condition shall be performed, any discrepancies or deficiencies discovered as a result of this procedure shall be corrected, and a retest conducted. The slide shall be completely opened and closed in the guidelines, any discrepancies or deficiencies discovered as a result of this procedure shall be corrected, and a retest conducted. The slide shall be completely opened and closed in the guidelines several times to ensure that it operates freely. The gate shall then be disassembled to the extent necessary for shipment. The Contractor shall notify the Contracting Officer sufficiently in advance so that a representative of the Contracting Officer may witness the assembly, testing, and disassembly work unless this requirement is waived in writing, The hoist shall be operated a sufficient length of time to ensure proper assembly and operation. Any malfunctions or discrepancies disclosed as a result of these tests shall be promptly remedied by the Contractor at no additional expense to the Government, and retests shall be conducted.

PART 3 EXECUTION

3.1 ERECTION, INSTALLATION, APPLICATION

3.1.1 Special Techniques

All installation of the gate, hoist, and appurtenances shall be in accordance with the manufacturer's installation instructions and under the supervision and direction of the erecting engineer. The hoist and all elements of the gate shall be cleaned of all protective coating used

thereon during shipment and storage, and all rust, dirt, grit, and other foreign matter shall be removed. The hoist and each element of the gate shall be carefully and accurately aligned so that after it is fastened in place there will be no binding or excessive pressure or wear in any moving part and no distortion of any member. Fasteners shall be tightened uniformly and firmly, but care shall be taken not to over stress either the fastener or the member with which it is associated. Where specific torque values or ranges are cited in the installation instructions, an accurately calibrated torque wrench, having the proper capacity range, shall be used. Stillson wrenches, cold chisels, or other tools likely to cause injury to the surface of any part shall not be used in the work of assembly or tightening. All fasteners shall be installed with an anaerobic locking compound similar and equal to that of the LOCTITE Corporation. Cleaning prior to application of the locking compound shall follow the manufacturer's recommendations. All shims shall be of either bronze or corrosion-resisting steel. Where grouting is required, either an epoxy grout or a ready-to-use, non-shrinking grouting material requiring only mixing with water at the work site shall be used, and use of any grouting material shall be as recommended by the manufacturer. All blocking and wedges used for support during initial grouting shall be removed prior to final grouting.

3.1.2 Erecting Engineer

The Contractor shall furnish the services of a competent erecting engineer to supervise and direct the installation and testing of the gates and hoists furnished under this section. The erection engineer shall be present for:

a. Complete installation of the anchor bolts and all other items to be embedded in concrete.

b. Complete installation of the gate frames, guides, slide, and stem.

c. Adjustment of all seals and wedges.

d. Complete installation and operation of the gate hoist.

e. All specified testing.

3.2 FIELD TESTS AND INSPECTIONS

3.2.1 Tests

3.2.1.1 General

The hoist shall be lubricated prior to any use or operation. Each bearing shall be lubricated through its associated lubrication fitting, and the gears shall be packed with lubricant at assembly. Prior to testing, the gate seat facings and wedging devices shall be cleaned of all foreign material and lubricated thoroughly with a light grease. Just prior to field assembly, the lift nut and stem threads shall be lubricated. All hoist lubricants shall be as recommended by the gate and hoist manufacturer.

3.2.1.2 Gate and Hoist

Each gate and hoist shall be operated and tested by and at the expense of the Contractor and under the supervision and direction of the erecting engineer to determine if they have been properly manufactured, assembled,

and installed and if they meet the requirements of the specifications. The Contractor shall notify the Contracting Officer at least 5 days prior to commencing the testing. After the upper stop collar has been adjusted to within 1/16 inch of the operating nut and locked in place with the slide in the fully closed position and after the lower stop collar has been adjusted against its stop and locked in place, the slide shall be raised and lowered slowly and carefully not less than three times. Any malfunctions or discrepancies disclosed as a result of these tests shall be promptly remedied by the Contractor at no additional expense to the Government, and retests shall be conducted until there are no malfunctions or discrepancies. The gates shall be checked in the closed position for leakage using a 1 1/2 inch hose delivering a pitot tube pressure of 50 psi to a 1/2 inch nozzle. Leakage shall be no greater than a weep with no spray.

3.2.2 Inspection

The following inspections shall be made:

a. Inspect at the work site for damage to and defects in all material and equipment.

b. Storage at the work site.

c. Field painting.

d. Installation and tests.

e. Operation and maintenance after installation.

3.3 PROTECTION

After completion of the installation, the Contractor shall continue to maintain and protect the gate and hoist and shall keep it ready for operation at any time until acceptance.

-- End of Section --